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**UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK**

LEIGHTON TECHNOLOGIES LLC,

Plaintiff and Counterclaim Defendant,

V.

OBERTHUR CARD SYSTEMS, S.A.,

Defendant and Counterclaim Plaintiff.

04 Civ. 02496 (CM)(LMS)

OBERTHUR CARD SYSTEMS, S.A.

MARKMAN BRIEF

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Pursuant to the Court's Scheduling Order dated July 16, 2004, modified on September 8, 2004, Defendant Oberthur Card Systems, S.A. ("Oberthur") submits this Markman brief in support of its proposed claim construction.

Introduction

Leighton Technologies LLC ("Leighton") alleges that Oberthur infringes four United States patents hereafter referred to as the "Leighton patents" -- U.S. Pat. No. 5,817,207 ("the '207 patent") (Exhibit 1¹); U.S. Pat. No. 6,214,155 ("the '155 patent") (Exhibit 3); U.S. Pat. No. 6,036,099 ("the '099 patent") (Exhibit 2); and U.S. Pat. No. 6,514,367 ("the '367 patent") (Exhibit 4). This Court ordered Leighton to submit on or before October 15, 2004 a list of those claims in the Leighton patents that Leighton asserts Oberthur infringes and the Court permitted Leighton to conduct limited infringement discovery. Leighton submitted its list of allegedly infringed claims on October 15, 2004. See Exhibit 14. This list identifies 7 independent claims and 29 dependent claims in the four Leighton patents --claims 1, 6, 7, 8, 11 and 14-16 of the '207 patent, claims 1, 6, 7, 8 and 12-15 of the '155 patent, claims 1, 6, 7, 9, 12 and 14-16 of the '099 patent, and claims 1, 6, 9, 12, 15-17 and 19-23 of the '367 patent.

This brief is structured as follows. In the first two sections we discuss the technology of the Leighton patents and provide an abbreviated overview of the patents and their prosecution history as they relate to the issues in this brief. Section III contains a short review of the legal framework governing claim interpretation. Section IV contains our interpretation of the relevant terms of the Leighton patents.

¹ All references herein to Exhibits are references to the Exhibits attached to the accompanying Declaration of James David Jacobs, dated November 5, 2004 (the "Jacobs Declaration").

The Court will see that, even though there are four patents at issue in this case, the claims in the four patents are strikingly similar. Moreover, each claim term construed below appears in each of the Leighton patents. Because of Leighton's virtually identical use of the same claim terms in each patent specification and during the prosecution of each patent before the United States Patent and Trademark Office ("USPTO"), with one exception (for the term "electronic element"), each of the claim terms ("non-electronic carrier", "directly", "comprising the steps of", "encapsulated by" and "encapsulating", "coating ... with a layer of ink", "minimal first ram pressure", "first pressure, second pressure, third pressure", "controlled flow", "cooling ... in conjunction with the concurrent application of a third pressure", and "cooling ... while applying a second pressure") has the same meaning in all of the Leighton patents. Our interpretation of those terms is set forth in Appendix A.

Our claim term definitions rely on the intrinsic evidence. With respect to certain technical terms, we consult the ordinary meaning of those terms as defined in a technical dictionary. We also verify the meanings of non-technical terms in a non-technical dictionary.

I. Technology At Issue

The Leighton patents generally relate to a hot lamination process for making contactless and dual function smart cards. We are all familiar with the way in which ordinary plastic credit cards work in this country. The card has a magnetic strip and must be swiped through a reader in order for a transaction to be completed.

A more recently developed alternative to the magnetic strip card is the contact smart card. Smart cards use micro-chips (integrated circuits) instead of magnetic strips to, among other things, retain information about the cardholder. They have electrical contacts on the outer surface of the card that are electrically connected to the microchip. To properly use the contact smart card there must be direct contact between the card and a smart card reader.

The smart card industry has developed a new type of smart card, the contactless card. As the name suggests, the use of a contactless card does not require physical contact between the card and the smart card reader. Because the contactless card has an antenna embedded in it, such a smart card can transmit information contained on the microchip to a smart card reader without the card making physical contact with the reader. With a contactless card, it is sufficient for the card to be put in the proximity of the reader. An example of such contactless cards is the security cards used in many buildings (where the smart card reader can read a card placed near the reader even if the card is in a person's pocketbook).

There is also a card known as a dual function card. This type of smart card has both external contacts and an embedded antenna connected to the micro-chip. Thus, it can be used with both contact and contactless card readers.

For many years prior to Leighton's alleged inventive lamination process, chip cards, including contactless cards and dual function cards, had been manufactured using lamination techniques. Lamination had been a well known procedure for bonding card layers using heat and pressure. Leighton alleges in his patents that he has invented a new lamination technique for manufacturing contactless and dual function cards.

Two of the four Leighton patents involved in this suit (the '207 patent and the '155 patent) relate to contactless cards. The other two Leighton patents (the '099 patent and the '367 patent) relate to dual function cards.

II. The Leighton Patents

A detailed discussion of the patents, and their history, is set forth in Appendix B to this brief. As the Court will see, that detailed discussion is based on intrinsic evidence and the statements therein are supported by citations to the record. We have included in this section of the brief an abbreviated version of Appendix B. To make it easier to read, this abbreviated discussion does not include any citations, but we represent that all of the statements herein are taken from Appendix B and are fully supported by the record. We believe that this abbreviated overview strikes the proper balance between providing the Court with a general understanding of the Leighton patents, while not interjecting levels of detail that might not seem significant until after the Court has a better understanding of our position. As the Court will see, the four

Leighton patents and claims are strikingly similar, a factor that should be considered in interpreting language that appears in multiple patents.²

A. The ‘207 Patent

Leighton first filed a patent application on his allegedly inventive lamination process on October 17, 1995 (“‘685 provisional”). That application states that the “main object” of Leighton’s invention is a hot lamination process that produces a plastic card that capsulizes a computer chip and an antenna, yet has a smooth surface with less than 5 ten thousandths of an inch variation capable of receiving dye sublimation printing. Indeed, Leighton repeatedly emphasizes this objective in the ‘685 provisional. Leighton describes dye sublimation printing as a technique for printing on the card surface itself:

Dye sublimation printing is a method of printing *on the surface of* individual *plastic cards* (one card at a time) using a computer printer and a video camera. [emphasis added]

Throughout that provisional application, Leighton refers to a “computer chip and a wire or circuit board antenna” as if they were an inseparable pair. In his later filed patents, Leighton refers to that combination of a chip and an antenna as an “electronic element”.

On October 7, 1996, Leighton filed the application that matured into the ‘207 patent. That application relied on the ‘685 provisional application for priority. Leighton stresses

² At times in this brief, claim language is underlined and bracketed. When the USPTO examined the Leighton patents, the practice was for the patent applicant to indicate additions to patent claims by underlining the added material and to indicate deletions from patent claims by enclosing the deleted material in square brackets. Additionally, although a patent application bears a different number than the corresponding issued patent, for ease of comprehension, we use the issued patent number to also refer to the application from which it issued. However, we distinguish a claim recited in an application from a claim in the corresponding patent by referring to the former as an “application claim”. To further promote readability, we have placed all numbers referring to elements in the Leighton patents in square brackets and in a reduced font.

throughout the '207 specification that his invention lies in producing a contactless card, *i.e.*, a card with a chip and an antenna, with a sufficiently smooth and regular surface that can receive dye sublimation printing. The '207 patent also defines this minimum smoothness as approximately 5 ten thousandths of an inch or better. Moreover, Leighton again defines an electronic element [20] as the combination of different types of micro-chips and antennas:

As shown in FIG. 3A-3C respectively, electronic element 20, 20', 20'' may be provided by *a micro-chip 22 including a wire antenna 24 connected thereto, a micro-chip 22' and a circuit board antenna 24', a read/write micro-chip 22'' and a wire coil antenna 24''*, or any other suitable electronic element.

The '207 patent describes Leighton's "inventive" lamination process for making contactless cards. An electronic element [20] -- the micro-chip and antenna mentioned immediately above -- is positioned between two sheets of card stock [30], [32] to form a core [33]. As will be discussed in greater detail below, this electronic element must be placed directly between the two sheets of card stock and not in some type of protective casing.

The core [33] is then placed in a laminator apparatus. The laminator is of the type well-known in the art of plastic card manufacturing and includes a pair of plates ("platens") for applying pressure to the core [33] and providing both heat and chill cycles. There are then a series of cycles at which different temperatures and pressures are applied to the core. In the first lamination cycle, little or no ram pressure is applied to the core. Then, a laminator heat cycle is initiated, in which the temperature of platens is increased to a range of 275° F. to 400° F. for a period of greater than 5 minutes, and preferably in the range of 7 to 10 minutes.

As a result of this heating process, the card stock is liquefied, a necessary step in creating a smart card in which a micro-chip and antenna is embedded within the card. In the next step,

the ram pressure of the laminator [40] is increased to facilitate the flow of the plastic card stock [30, 32] so that the flow encapsulates one or more electronic elements [20]. That is followed by a chill cycle, during which time the ram pressure of the laminator [40] is increased, preferably by approximately 25%, until the platens [42, 44] have cooled to approximately 40° F. to 65° F. for approximately 10-15 minutes.

The laminated core is then removed for additional processing. Using known printing techniques, Leighton coats the outer surface of the core with a layer of ink and then positions a layer of overlamine film on the ink coated surface of the core.

A second lamination cycle then begins. There is a heat cycle in the range of 175° F. to 300° F. for a period of 10 to 25 minutes with a ram pressure. That is followed by a chill cycle, preferably with a corresponding increase in ram pressure. The finished cards are “sufficiently smooth and regular to receive dye sublimation printing” and thus satisfy Leighton’s main objective.

As originally filed, the application that matured into the ‘207 patent had 22 claims. The Examiner rejected all the claims then pending as obvious in view of U.S. Patent No. 4,450,024 (“the ‘024 prior art patent”). In his response, Leighton narrowed application claim 1 to recite an unprotected “electronic element in the absence of a non-electronic carrier” positioned “directly” between “first and second plastic core sheets”. This was a significant change and will be discussed in greater detail below. As Leighton explained, his claimed heat and pressure cycle permits the “electronic element” to be placed “directly” between the “core sheets” without any additional protection, such as a recess, a buffer zone, or a protective carrier. Leighton used the term “non-electronic carrier” in his amended application claim to signify such protective

structures. Leighton contended that the prior art required non-electronic carriers to protect the electronic element from the intense pressures applied during the lamination process but that his inventive process totally eliminated the need for such measures.

The Examiner allowed all the pending claims on April 13, 1998.

B. The '099 Patent

Leighton filed the application that matured into the '099 patent (Exhibit 2) on August 18, 1997, approximately 10 months after filing the application that matured into the '207 patent. The '099 patent application is a continuation-in-part of the '207 patent application.

Whereas the '207 patent is directed to a contactless card and a hot lamination process for the manufacture of such a card, the '099 patent purports to relate to a so-called dual function card, which is a combination contact/contactless card. Despite the fact that the patents relate to different types of cards, the specifications of the '207 and the '099 patents share virtually the same disclosure. This can be seen in Exhibit 10, which is a document comparison of the '207 patent and the '099 patent.³

Similar to its predecessor, the '207 patent, the '099 patent specification stresses that Leighton's invention relates to the manufacturing process of a plastic card with embedded elements and with a sufficiently smooth outer surface on which to print. To achieve this same objective, the '099 patent specification teaches the same steps for embedding the "electronic

³ We have submitted a number of documents to the Court in which we compare the language of one patent to another. They were all generated in the same way. We downloaded from the USPTO web site the respective patents, ran the downloaded patents through a computer program that stripped the files of all HTML tags and compared the resulting files using the commercially available Delta View program. Jacobs Declaration, ¶ 7.

element” in a core, positioning the core in the laminator apparatus and applying the identical heat and pressure sequence.

The prosecution of the ‘099 patent also bears a strong resemblance to that of the ‘207 patent. The Examiner for the ‘099 patent found that the originally filed claims were unpatentable over the same ‘024 prior art patent in view of several other U.S. patents.

Leighton responded by amending some application claims and deleting others. Following the pattern he set in the ‘207 patent application and that he repeats with the ‘155 application and inferentially in the ‘367 application, Leighton amended all his claims in the ‘099 patent to require that the electronic element have no protection -- that there be an absence of a “non-electronic carrier” and that the “electronic element” be “directly” between the “core sheets”. Leighton’s remarks repeated word for word the remarks he made to the Examiner in response to the rejection that Leighton received during the prosecution of the ‘207 patent.

The Examiner thereafter allowed all the pending claims. His remarks showed that he relied exclusively on Leighton’s argument that his process did not require the electronic element to be protected. The Examiner said, “No prior art or reasonable combination of art was found to overcome the limitation of the electronic unit being place [sic] directly between two plastic sheets.”

C. The ‘155 Patent

Approximately two years after filing the application that matured into the ‘207 patent, on September 22, 1998, Leighton filed the ‘155 patent application. Like the ‘207 patent, the ‘155 patent relates to contactless cards.

The ‘155 patent application is a continuation of the ‘207 patent application and duplicates in all substantive respects the ‘207 patent specification. See the comparison in Exhibit 11. The Examiner rejected the ‘155 patent application claims over substantially the same prior art that formed the basis for the rejection of the ‘207 patent application. As might be expected, Leighton’s amendments to the ‘155 patent application claims were identical to the ones he made to the ‘207 patent application claims. Most significantly, he once again narrowed application claim 1 to recite an unprotected “electronic element in the absence of a non-electronic carrier” positioned “directly” between “first and second plastic core sheets”.

The similarities between the ‘155 patent and the ‘207 patent are substantial. Claim 1 of the ‘155 patent is identical to claim 1 of the ‘207 patent, except that claim 1 of the ‘155 patent omits the coating step. Claim 15 of the ‘155 patent is the same as claim 16 of the ‘207 patent, except that claim 15 of the ‘155 patent omits the printing step. Significantly, the lamination process claimed in the ‘207 and ‘155 patents, including the serial steps of heating, cooling, and applying pressure, is identical.

The Examiner allowed the pending claims on June 5, 2000.

D. The ‘367 Patent

Leighton filed the application that matured into the ‘367 patent on August 5, 1999. By that time, Leighton had the benefit of his experience in the prosecution of the ‘207 and ‘099

patents. As a result, all the originally filed claims in the '367 patent contained the limitations "non-electronic carrier" and "directly" that Leighton had been required to add to the related applications to achieve their allowance.

The '367 patent is a continuation of the '099 patent and therefore, except with respect to matters not here relevant, the specifications are identical. It is also a continuation-in-part of the '207 patent. Exhibit 12 is a document comparison of the '099 patent and the '367 patent. The '367 patent includes two independent claims, claims 1 and 20, which, with one significant change, are copies of claim 1 in the '099 patent.

Notably, unlike the Examiners who examined Leighton's earlier patents, the Examiner for the '367 patent uncovered prior art that had not previously been found, Japanese Patent 6-176214 (the "Japanese Patent"). According to the Examiner, the Japanese Patent taught laminating an unprotected chip and antenna. As already noted, in connection with the other patents, Leighton had argued that the inventiveness in his process was that it allowed the electronic components to be placed directly on the card stock without any protection. That argument was obviously insufficient to overcome prior art that taught laminating unprotected components.

Thus, Leighton came up with a new argument. He amended the two independent application claims by adding a limitation that required the pressure during cooling to be at least 10 % greater than the pressure during heating. The Examiner stated that none of the prior art of record taught or suggested this limitation and he, therefore, allowed the claims. The rejection based upon the Japanese Patent prior art obviously has implications to the validity of Leighton's three other patents and to whether Leighton met his duty of full disclosure to the USPTO with

respect to the still pending '155 application, but those issues are beyond the scope of this Markman hearing.

III. Legal Framework For Construing Claim Language

The first step in a patent infringement case is for the court to construe, as a matter of law, the meaning of the terms in the asserted patent claims. *See Markman v. Westview Instrs., Inc.*, 52 F.3d 967, 970-71, 976 (Fed. Cir. 1995) (*en banc*), *aff'd*, 517 U.S. 370 (1996). This brief discusses the claim terms that the Court should construe.

The claims of the patent define the “metes and bounds” of the invention. *Zenith Labs., Inc. v. Bristol-Myers Squibb Co.*, 19 F.3d 1418, 1424 (Fed. Cir. 1994). When interpreting the meaning and scope of a patent claim, there is a general “hierarchy of analytical tools” that the Court must consult. *Digital Biometrics, Inc. v. Identix, Inc.*, 149 F.3d 1335, 1344 (Fed. Cir. 1998). This hierarchy consists of the claims, the written description of the invention, and the correspondence between the patent applicant and the USPTO, often referred to as the “prosecution history”. *Id.* These sources are collectively referred to as the “intrinsic evidence”; they constitute the public record of the patent and provide the public with fair notice of the scope and meaning of the claims. *Id.*; *see also Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996).

In addition to considering the intrinsic evidence, “[t]he court may, in its discretion, receive extrinsic evidence in order to aid the court in coming to a correct conclusion as to the true meaning of the language employed in the patent.” *Markman*, 52 F.3d at 980. “Dictionaries and technical treatises, which are extrinsic evidence, hold a ‘special place’ and may sometimes be considered along with the intrinsic evidence when determining the ordinary meaning of claim

terms.” *Bell Atlantic Serv., Inc. v. Covad Communications Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001) (citation omitted); *Texas Digital Systems, Inc. v. Telegenix, Inc.*, 308 F.3d 1193, 1202 (Fed. Cir. 2002) (“[D]ictionaries, encyclopedias and treatises are particularly useful resources to assist the court in determining the ordinary and customary meanings of claim terms.”).

A. Claims

The proper starting point for any claim construction exercise is the actual language of the claim itself. *See Vitronics*, 90 F.3d at 1582. A claim term must be construed with reference to the language of the claim in which it appears in its entirety. *Hockerson-Halberstadt, Inc. v. Converse Inc.*, 183 F.3d 1369, 1374 (Fed. Cir. 1999) (“Proper claim construction demands interpretation of the entire claim in context, not a single element in isolation.”). A claim term must also be construed with regard to other claims in the patent. *Southwall Techs., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1579 (Fed. Cir. 1995) (“Interpretation of a disputed claim term requires reference not only to the specification and prosecution history, but also to other claims.”) (internal citations omitted). Further, the same claim terms in related patents are generally construed to have the same meaning. *Abtox, Inc. v. Exitron Corp.*, 131 F.3d 1009, 1010, modifying 122 F.3d 1019 (Fed. Cir. 1997) (“it would be improper to construe this term differently in one patent than another, given their common ancestry”).

“In the absence of an express intent to impart a novel meaning to claim terms, an inventor’s claim terms take on their ordinary meaning.” *Teleflex, Inc. v. Ficosa North America Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002). “[T]he ordinary meaning must be determined from the standpoint of a person of ordinary skill in the relevant art.” *Id.* To help inform the court of

the ordinary meaning of the words, a court may consult a dictionary, encyclopedia, or treatise. *Texas Digital Systems, Inc.*, 308 F.3d at 1202.

B. Specification

“For claim construction purposes, the description [in the specification of a patent] may act as a sort of dictionary, which explains the invention and may define terms used in the claims.” *Markman*, 52 F.3d at 979. Accordingly, the specification may contain information relevant to the meaning of a claim term, furnishing a definition for the language in question, providing background information related to the technology in question, or identifying elements or technologies that fall outside the scope of the claims. *See, e.g., DeMarini Sports, Inc. v. Worth, Inc.*, 239 F.3d 1314, 1323-25 (Fed. Cir. 2001); *Toro Co. v. White Consol. Indus., Inc.*, 199 F.3d 1295, 1301-02 (Fed. Cir. 1999); *Vitronics*, 90 F.3d at 1582. Furthermore, “where the specification makes clear at various points that the claimed invention is narrower than the claim language might imply, it is entirely permissible and proper to limit the claims.” *Alloc, Inc. v. Int’l Trade Commission*, 342 F.3d 1361, 1370 (Fed. Cir. 2003) (citing *SciMed Life Systems, Inc. v. Advanced Cardiovascular Systems, Inc.*, 242 F.3d 1337, 1345 (Fed. Cir. 2001)); *see also Watts v. XL Systems, Inc.*, 232 F.3d 877, 883 (Fed. Cir. 2000) (in light of a phrase in the specification stating that invention utilizes a varying taper angle feature, the court construed the claim language as limited to connections effected by misaligned taper angles); *Toro Co.*, 199 F.3d at 1301-02 (where specification and drawings showed ring as part of and permanently attached to cover, the court construed the term “including” in the claims as requiring that the pressure increasing means be attached to the cover); *Wang Labs, Inc. v. America Online, Inc.*, 197 F.3d 1377, 1382 (Fed. Cir. 1999) (where system described and enabled in the patent specification

used a character-based protocol, the court construed the claims as limited to character-based systems).

The Federal Circuit has also held that it is proper to consider the Abstract in the specification for claim interpretation purposes:

We have frequently looked to the abstract to determine the scope of the invention, and we are aware of no legal principle that would require us to disregard that potentially helpful source of intrinsic evidence as to the meaning of claims.

Hill-Rom Company, Inc. v. Kinetic Concepts, Inc., 209 F.3d 1337, 1341 n.* (Fed. Cir. 2000) (internal citations omitted); *see also Tate Access Floors, Inc. v. Maxcess Technologies, Inc.*, 222 F.3d 958, 966 n.2 (Fed. Cir. 2000) (citing 209 F.3d at 1341 n.*) (“[I]n determining the scope of a claim, the abstract of a patent is a potentially useful source of intrinsic evidence as to the meaning of a disputed claim term.”); *Dow Chemical Company v. United States*, 226 F.3d 1334 (Fed. Cir. 2000) (relying on the abstract to construe the claim term “injection rate”).

C. Prosecution History

In addition to the patent specification, the prosecution history is “often of critical significance” in construing patent claims. *Vitronics*, 90 F.3d at 1582. The prosecution history might contain contemporaneous exchanges between the applicant and the patent examiner about the meaning of claim terms. *Digital Biometrics*, 149 F.3d at 1344. When terms have been defined during these types of exchanges, the patentee “may not proffer an interpretation for the purposes of litigation that would alter the indisputable public record . . . and treat the claims as a ‘nose of wax.’” *Southwall*, 54 F.3d at 1578. Additionally, “[t]he prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution.” *Id.* at 1576.

A patent applicant’s global remarks in characterizing the invention are limiting even though the applicant may have specifically distinguished each claim on more narrow grounds. *Digital Biometrics, Inc.*, 149 F.3d at 1347 (“While it is true that the applicants went on to specifically distinguish each claim . . . on more narrow grounds, that does not eliminate global comments made to distinguish the applicants’ ‘claimed invention’ from the prior art”). “Post-hoc, litigation-inspired argument cannot be used to reclaim subject matter that the public record in the PTO clearly shows has been abandoned.” *Desper Products, Inc. v. QSound Labs, Inc.*, 157 F.3d 1325, 1340 (Fed. Cir. 1998).

Furthermore, any statement made by the patentee during the prosecution of an application is relevant for interpreting claims in a related application. *See Microsoft Corporation v. Multi-Tech Systems, Inc.*, 357 F.3d 1340 (Fed. Cir. 2004); *see also, Wang Labs, Inc.*, 197 F.3d at 1384 (applying the file history of a parent in the continuation-in-part application to reinforce the

conclusion that the inventors focused their invention, and the description and claims directed to that invention, on a character-based system); *Alloc, Inc.*, 342 F.3d at 1371 (citing *Augustine Med., Inc. v. Gaymar Indus., Inc.*, 181 F.3d 1291, 1300 (Fed. Cir. 1999), noting that the prosecution history of a parent patent application may limit the scope of a later patent application using the same claim term); *Watts*, 232 F.3d at 884 (stating that the prosecution history of the ‘717 patent also applied to claim 1 of the ‘411 patent because: (1) the ‘411 patent was a continuation-in-part of the ‘717 patent; (2) claim 1 of the ‘411 patent also had a sealingly connected limitation; and (3) the prosecution history of the ‘411 patent contained nothing to the contrary); *Jonsson v. Stanley Works*, 903 F.2d 812, 818 (Fed. Cir. 1990) (stating that prosecution history of the parent patent and the construction of the term “diffuse light” contained in that patent, was relevant to an understanding of “diffuse light” as that term was used in the continuation-in-part patent).

In *Microsoft*, the patentee owned three related patents (the ‘627, ‘649 and ‘532 patents) that shared the same specification. During the prosecution of the ‘627 patent, the patentee made a statement directed to the system disclosed in the specification. The court in *Microsoft* found that, since the specifications of the three patents were identical, the patentee’s statement was not limited to the invention disclosed in the ‘627 patent, but was a representation of the patentee’s own understanding of the inventions disclosed in all three patents. The court stated:

Any statement of the patentee in the prosecution of a related application as to the scope of the invention would be relevant to claim construction, and the relevance of the statement made in this instance is enhanced by the fact that it was made in an official proceeding in which the patentee had every incentive to exercise care in characterizing the scope of its invention. Accordingly, we conclude that Multi-Tech’s statements made during the prosecution of the ‘627 patent with regard to the scope of its

inventions as disclosed in the common specification are relevant not only to the '627 and '532 patents, but also to the earlier issued '649 patent.

Id. at 1350. The court thus concluded that the statement from the '627 patent's prosecution history was pertinent to an interpretation of the claims in the other two patents – both later issued and earlier issued – that shared the same specification.

D. Process or Method Claims

A process is one of the four categories of patentable subject matter. 35 U.S.C. § 101.

For process or method claims, recited steps therein may be interpreted to require that the steps be performed in a specific order. *Interactive Gift Express, Inc. v. CompuServe Inc.*, 256 F.3d 1323, 1342 (Fed. Cir. 2001). The Federal Circuit recently referred to a two-part test for determining whether the steps included in a process claim must be performed in the recited order:

First, we look to the claim language to determine if, as a matter of logic or grammar, they must be performed in the order written.... If not, we next look to the rest of the specification to determine whether it “directly or implicitly requires such a narrow construction.”

Altiris, Inc. v. Symantec Corp., 318 F.3d 1363, 1369-70 (Fed. Cir. 2003) (internal citations omitted).

In *Loral Fairchild Corp. v. Sony Electronics Corp.*, the court held that the claim language, the specification and the prosecution history all indicated that the steps had to be performed in their written order. *Loral Fairchild Corp. v. Sony Electronics Corp.*, 181 F.3d 1313, 1322 (Fed. Cir. 1999). The court pointed out that the literal language of the claim required a sequential reading, because a recited step called for the alignment of a second structure with a first structure formed by the prior step. *Id.*, 181 F.3d at 1321. Similarly, in *Mantech Envtl. Corp. v. Hudson Envtl. Services, Inc.*, the Court held “that the sequential nature of the claim steps is apparent

from the plain meaning of the claim language and nothing in the written description suggests otherwise”. *Mantech Envtl. Corp. v. Hudson Envtl. Services, Inc.*, 152 F.3d 1368, 1376 (Fed. Cir. 1998). Thus, where the language of the claim, the specification and the prosecution history logically indicate a sequential process, recited steps in a claim must be read to require a sequential order.

E. Sequential Modifiers

While patent drafters commonly use the terms “first”, “second” and “third” to identify separate elements, such practice in no way precludes a finding that these terms may also explain temporal or positional relations. See *Applera Corp. v. Micromass UK Ltd.*, 186 F. Supp. 2d 487, 505 (D. Del. 2002) (McKelvie, J.), *aff’d* without published opinion 60 Fed. Appx. 800 (Fed. Cir. 2003).

In *Applera*, Plaintiff owned a patent teaching a mass spectrometer which would more efficiently guide ions into a mass filter. Plaintiff’s patent was directed to achieving improved ion transmission in an ion guide by using certain parameters of pressure, voltage and rod length. Claims 1 and 14 of Plaintiff’s patent used “first” or “second” to modify various claim elements, such as “vacuum chamber”, “rod set”, and “space”. The construction of “first” and “second” in these claims was significant because Defendant’s spectrometer had an empty vacuum chamber before the chamber alleged by Plaintiff to be the “first vacuum chamber”.

Plaintiff argued that its use of the terms “first” and “second” only identified particular elements, without specifying the order that these elements appeared in the path of ion travel. The court rejected this construction, finding, among other things, that Plaintiff had relied on positional differences between the elements during reexamination and had therefore disclaimed

the broad construction for which it was arguing . Id. at 507. Thus, rather than finding that the modifiers “first” and “second” only acted to differentiate the claim elements, the court held that those terms necessarily indicated the relative position of those elements. Id. at 508; see also *Applera Corp. v. Micromass UK Ltd.*, 204 F. Supp. 2d 724, 749 (D. Del. 2002) (McKelvie, J.), *aff’d* without published opinion 60 Fed. Appx. 800 (Fed. Cir. 2003) (on rehearing, the court noted that “the only reasonable construction” of the terms in light of the purpose of the invention was to explain relative positions).

IV. Claim Construction

Because of Leighton’s virtually identical use of the claim terms in each patent specification and during the prosecution of each patent before the USPTO, the claim terms have the same meaning in all of the Leighton patents with the possible exception of the term “electronic element”. The following claim term definitions rely on the intrinsic evidence. In connection with a few instances of technical terms, we also rely on the ordinary meaning of those terms as defined in a technical dictionary. We also verify the meanings of non-technical terms in a non-technical dictionary.

We first set forth the interpretation of claim terms recited in the ‘207 patent and then address those same claim terms as recited in the ‘155 patent, ‘099 patent and ‘367 patent.

A. The ‘207 Patent

1. “electronic element”

The term “electronic element” means a micro-chip and an antenna.
--

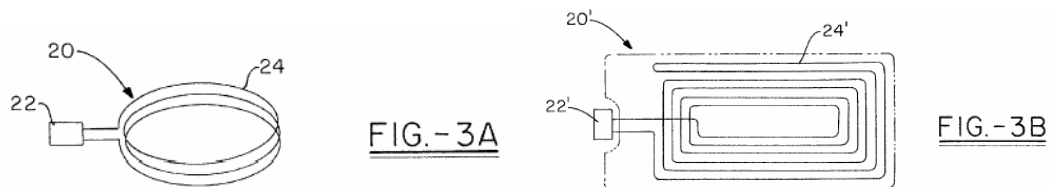
Independent claims 1 and 16 in the ‘207 patent include repeated use of the term “electronic element”. The term “electronic element” lacks an ordinary and customary meaning.

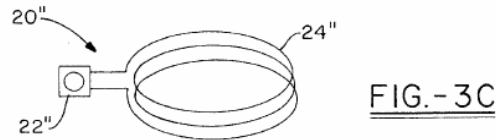
Neither a general dictionary nor a technical dictionary defines this term. For instance, we did not find a definition for the term “electronic element” in the Webster’s Ninth New Collegiate Dictionary (1983) or in the Dictionary of Scientific and Technical Terms (McGraw Hill 6th ed. 2003).

However, intrinsic evidence in the ‘207 patent provides the definition of this term. Leighton explains that his invention relates to “radio frequency identification (RFID) cards”. ‘207 patent, Ex. 1, col. 1, lines 13-14. As discussed above, in order for such cards to work, the card must contain a micro-chip and an antenna. The ‘207 patent specification makes clear that, indeed, the term “electronic element” includes a micro-chip (integrated circuit) and an antenna:

Electronic element 20 may take a wide variety of forms and perform a wide variety of functions. As shown in FIG. 3A-3C respectively, electronic element 20, 20’, 20’’ may be provided by *a micro-chip 22 including a wire antenna 24 connected thereto, a micro-chip 22’ and a circuit board antenna 24’, a read/write micro-chip 22’’ and a wire coil antenna 24’’*, or any other suitable electronic element.

‘207 patent, Ex. 1, col. 3, lines 46-52 (emphasis added). That is, Leighton explains that his “electronic element”, labeled [20], is a combination of a micro-chip [22] and an antenna [24]. In Figures 3A, 3B and 3C, Leighton provides three examples of his “electronic element”.





As all three Figures make clear, the electronic element [20] is a combination of a micro-chip [22] and an antenna [24]. Not surprisingly, because an RFID card requires both the micro-chip and the antenna in order to work, nowhere in the specification is there a statement that the “electronic element” can exclude the micro-chip or the antenna.

The dependent claims as originally filed in the ‘207 patent further define the term “electronic element” as being a particular type of micro-chip and a particular type of antenna. Dependent claim 13 recites “wherein said at least one electronic element is a micro-chip and an associated wire antenna”, dependent claim 14 recites “wherein said at least one electronic element is a micro-chip and an associated circuit board antenna” and dependent claim 15 recites “wherein said at least one electronic element is a read/write integrated chip and an associated antenna”. Not one claim, independent or dependent, defines the term “electronic element” as either a micro-chip or an antenna alone. This clearly suggests that the “electronic element” is a micro-chip plus an antenna.

2. “non-electronic carrier”

The term “non-electronic carrier” means a structure without any substantial electronic function, such as a recess, buffer or protective carrier, that at least partially protects during lamination the “electronic element” from damage caused by lamination pressure.

Claim 1 recites in pertinent part:

- (b) positioning said at least one electronic element in the absence of a *non-electronic carrier* directly between said first and second plastic core sheets to form a core, said plastic core sheets defining a pair of inner and outer surfaces of said core;

‘207 patent, Ex. 1, col. 6, lines 22-26 (emphasis added).

The term “non-electronic carrier” has no well accepted meaning. However, the meaning of the term “non-electronic carrier” is readily apparent by consulting the intrinsic evidence -- the patent specification and the prosecution history of the ‘207 patent.

The patent specification describes a hot lamination method for manufacturing a plastic card having at least one electronic element embedded therein. *See, e.g.*, ‘207 patent, Ex. 1, col. 3, line 66-col. 5, line 5. Throughout the specification, Leighton simply describes positioning electronic element [20] between first and second plastic core sheets [30], [32], as can be seen in Figure 4. Figure 4 shows the encapsulated electronic element [20] fully contained within the boundaries of the card surfaces and edges. The specification is devoid of any reference to protecting the “electronic element” during lamination.

Moreover, the prosecution history confirms that the claim does not cover an electronic element that is protected. Independent application claim 1, as filed, used the following language:

positioning at least one electronic element between said first and second plastic core sheets to form a layered core;

‘207 patent application, Ex. 6, p. 44. The USPTO mailed an Office Action on September 8, 1997 that rejected all claims as obvious in view of the ‘024 prior art patent. Ex. 6, p.69. The Examiner did not believe that there was anything inventive about putting an electronic element between two sheets.

In response to this rejection, Leighton explained that the ‘024 prior art patent did not teach the process of Leighton’s ‘207 patent because the significance of the latter was that it eliminated the need for any protective structures such as a recess or a buffer zone. Leighton

amended claim 1 and, in pertinent part, added the phrase “in the absence of a non-electronic carrier”:

positioning said at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets to form a [layered] core, said plastic core sheets defining a pair of inner and outer surfaces of said core;

Office Action Response, Ex. 6, p. 74.

In distinguishing the ‘024 prior art patent, Leighton explained the significance of the newly added “in the absence of a non-electronic carrier” limitation. In an extended argument, Leighton defined the term “in the absence of a non-electronic carrier” to mean that the “electronic element” in his invention is not protected. Leighton represented that his alleged inventive heat and pressure cycle provided all the protection from the laminating pressure that the “electronic element” required.

The ‘024 patent claims a lamination process for making an electronic card which protects the electronic element of the card by first placing it in a recess formed within a card layer so as to avoid damage to the electronic element from localized pressure applied in the lamination process. The patent then requires that a ‘buffer zone’ be present within the recess. Even the broadest of claims of the ‘024 patent require a recess and a buffer zone, for and protecting the electronic element. These are required by the ‘024 invention in order to enable the card assembly to be subjected to a full laminating pressure.

No such protective elements are desired or necessary to the invention of the present application. Further, the invention taught by the ‘024 patent requires that the electronic element also be placed in a protective carrier disk (6), which is substantially located within the recess.

The controlled use of a heat and pressure cycle of the present invention eliminates the requirement of both a protective carrier disk for the electronic element and/or a recess or other buffer zone formed in one or more of the card layers for carrying and protecting the electronic element. The process of the present invention allows the electronics-containing core to be subjected to the full laminating pressure *without use of a recess in a*

card layer. Unlike anything shown in the prior art, the electronic element is placed directly between two (2) plastic sheets.

Office Action Response, Ex. 6, p. 79 (emphasis added).

In sum, in order to overcome the Examiner's rejection of his patent over the '024 prior art patent, Leighton added the limitation "in the absence of a non-electronic carrier". By amending independent claim 1 to include the term "non-electronic carrier" and also adding a new independent claim with that limitation Leighton relinquished any interpretation of this term that includes any protection of an "electronic element". *See Southwall*, 54 F.3d at 1576.

3. "directly"

The term "directly" means that there is nothing between the "electronic element" and the first plastic core sheet and nothing between the "electronic element" and the second plastic core sheet.

Independent claim 1 of the '207 patent recites the term "directly" and its relevance to the "electronic element" and the "first and second plastic core sheets":

(b) positioning said at least one electronic element in the absence of a non-electronic carrier *directly* between said first and second plastic core sheets to form a core, said plastic core sheets defining a pair of inner and outer surfaces of said core;

'207 patent, Ex. 1, col. 6, lines 22-26 (emphasis added). Similarly, independent claim 16 recites:

(b) positioning at least one electronic element in the absence of a non-electronic carrier *directly* between said first and second plastic core sheets to form a layered core;

'207 patent, Ex. 1, col. 8, lines 15-18 (emphasis added).

The term "directly" is not a technical term. According to the Merriam-Webster dictionary, the ordinary and customary meaning of the term "directly" is "in immediate physical contact". Webster's Ninth New Collegiate Dictionary (1983). At the very least therefore

“directly” means that there is nothing between the “electronic element” and the first plastic core sheet and nothing between the “electronic element” and the second plastic core sheet.

The patent specification supports that the term “directly” is used in its ordinary non-technical sense. The written description provides that “one or more cards [10] in accordance with the present invention may be manufactured by positioning an electronic element [20] between first and second sheets of card stock [30], [32] to form a core [33]”. ‘207 patent, Ex. 1, col. 3, line 66-col. 4, line 2. Figure 4 illustrates this positioning of the “electronic element” between the “plastic core sheets” before lamination. Figures 6 and 7 illustrate the “electronic element” being in immediate physical contact with the “plastic core sheets” after lamination.

The prosecution history of the ‘207 patent confirms that the term “directly” means that there is nothing between the “electronic element” and the first plastic core sheet and nothing between the “electronic element” and the second plastic core sheet. Indeed, the term was added for the specific purpose of making that point and in an effort to distinguish the invention from the prior art. In fact, the term “directly” was added during the same Office Action response discussed immediately above.

Recall, independent application claim 1, as filed, used the following language:

positioning at least one electronic element between said first and second plastic core sheets to form a layered core;

‘207 patent application, Ex. 6, p. 44. After rejection by the Examiner, Leighton amended the claim and narrowed this limitation:

positioning said at least one electronic element in the absence of a non-electronic carrier *directly* between said first and second plastic core sheets to form a [layered] core, said plastic core sheets defining a pair of inner and outer surfaces of said core;

Office Action Response, Ex. 6, p. 74 (emphasis added). In this Office Action response, Leighton also added independent application claim 23 (now claim 16) which includes the term “directly”.

Leighton’s explanation to the USPTO quoted above on page 24 likewise explains why he added the term “directly”. The ‘024 prior art patent describes an electronic element that was first placed in a recess so as to avoid damage to the electronic element from localized pressure applied in the lamination process and required that a “buffer zone” be present within the recess. Leighton explained that his invention was different because the “electronic element” was placed “directly” between the “core sheets” and did not require protection, *e.g.*, a protective carrier, a recess or a buffer:

The controlled use of a heat and pressure cycle of the present invention eliminates the requirement of both a protective carrier disk for the electronic element and/or a recess or other buffer zone formed in one or more of the card layers for carrying and protecting the electronic element. The process of the present invention allows the electronics-containing core to be subjected to the full laminating pressure without use of a recess in a card layer. Unlike anything shown in the prior art, the electronic unit is placed *directly* between two (2) plastic sheets.

Office Action Response, Ex. 6, p. 79 (emphasis added). By adding the term “directly” to claim 1 before the term “between” and also adding a new claim 16 with that limitation, Leighton narrowed his invention and relinquished any interpretation of the term “directly” that includes something, whether a hard protective structure or air, intervening between the “electronic element” and either the first or second “plastic core sheets”. *See Southwall*, 54 F.3d at 1576.

Leighton also disclaimed the inclusion of one or more card layers, for example, an adhesive layer, intervening between the “electronic element” and either the first or second “plastic core sheets”. In distinguishing the ‘024 prior art patent, Leighton stressed how the newly added “directly” limitation distinguished his invention from the prior art: “Unlike

anything shown in the prior art, the electronic element is placed *directly* between two (2) plastic sheets.” Office Action Response, Ex. 6, p.79 (emphasis added). In other words, Leighton advocated that the ‘024 prior art patent teaches that an electronic element is not placed directly between two plastic sheets which is contrary to his invention due to his recitation of the term “directly”. This teaching is confirmed by examining Figures 3a and 3b and the corresponding text in the ‘024 prior art patent. Specifically, the ‘024 prior art patent teaches the use of an adhesive layer between the carrier element [6] and the cover films [12], [13]:

FIGS. 3a and 3b [of the ‘024 patent] show the second embodiment of the invention, in which *one or more buffer zones are formed by intermediate layers in the card composite, for example by a so-called laminating adhesive*. For this purpose the cover films 12 and 13 are coated with the laminating adhesive 17 before the laminating process (FIG. 3a).

‘024 patent, Ex. 15, col. 4, lines 24-30 (emphasis added). Hence, Leighton disclaimed the inclusion of one or more card layers as intervening material.

4. “comprising the steps of”

The term “comprising the steps of” means the respective steps must be performed in a precise order.

Independent claims 1 and 16 in the ‘207 patent state in their preambles that they are claiming a “process”. Sensibly, therefore, the preambles of these claims include the term “comprising the steps of”. Furthermore, with respect to one of the steps in the process, the body of claims 1 and 16 include the term “comprising the steps of”. ‘207 patent, Ex. 1, col. 6, line 30 and col. 8, line 21.

As used in claims 1 and 16 the term “comprising the steps of” requires that the respective steps be performed in a precise order. Namely, for independent claim 1, step (a) must be performed first, step (b) performed second, step (c) performed third, step (d) performed fourth

and step (e) performed last. As for step (c), step (i) is performed first, step (ii) is performed second and step (iii) is performed third. The steps recited in independent claim 16 are to be performed in the same order, except that claim 16 does not include step (e). As discussed above, in both *Loral Fairchild Corp.* and *Mantech Envtl. Corp.*, the Federal Circuit held that where the language of the claim, the specification and the prosecution history logically indicated a sequential process, recited steps in a claim must be read to require a sequential order. *Loral Fairchild Corp.*, 181 F.3d at 1321; *Mantech Envtl. Corp.*, 152 F.3d at 1376.

The plain meaning of the claim language in the '207 patent supports the conclusion that the steps recited in independent claims 1 and 16 are to be performed in a specific order. First, Leighton preceded the elements of independent claims 1 and 16 with letters and roman numerals, *i.e.*, (a), (b), (c), (i), (ii), (iii), (d) and (e), indicating the ordering of the steps for incorporating an "electronic element" in a plastic card. Second, the claim language itself describing the steps necessitates a precise order. If the steps are not followed in the enumerated order, a plastic card is not manufactured that satisfies Leighton's main objective -- manufacturing a plastic card with a sufficiently smooth surface to receive dye sublimation printing.

The specification confirms this construction. The specification describes Leighton's objective and thereby stresses the requirement of performing the claimed steps in a specific order. For instance, when describing the heat and pressure cycle (the lamination), Leighton sets forth the required timing of one step in relation to another: "*Subsequent to placing one or more electronic elements [20] between the first and second sheets [30, 32] of plastic core stock to form a core [33],*" '207 patent, Ex. 1, col. 4, lines 22-24 (emphasis added); "*Once book [35] is positioned in laminator [40] as shown in FIG. 7, the first lamination cycle is initiated by closing*

laminator platens [42, 44]” ‘207 patent, Ex. 1, col. 4, lines 41-43 (emphasis added); “*Once the heat cycle has been applied* to the book [35]” ‘207 patent, Ex. 1, col. 4, lines 48-49 (emphasis added); and “*Subsequent to the above heat cycle*, laminator 40 applies a chill cycle to book [35]” ‘207 patent, Ex. 1, col. 4, lines 66-67 (emphasis added). The specification also expressly describes that the coating/printing step is performed after the core is laminated with the heat and pressure cycle recited in the claims:

Subsequent to the removal of core 33 from laminator 40, ... core 33 is coated on at least one of it’s upper and lower surfaces 34, 35 with a layer of printing ink 36.

‘207 patent, Ex. 1, col. 5, lines 6-9 (emphasis added).

The prosecution history confirms that the steps in the Leighton patent claims must be performed in the recited sequence. During the prosecution of the ‘207 patent, Leighton represented that the prior art did not teach the order of his claim steps, as well as the sub-steps within the heat and pressure cycle, and asserted that the sequence of claim steps was thus patentable:

The ‘024 [prior art] patent merely discusses the variation of pressure with temperature, it does not suggest *a sequence of steps* or the duration of steps which might be used to encapsulate an electronic element by a plastic card....

The Examiner correctly notes that it is well within the purview of one of ordinary skill in the art to vary temperature with the type of material being laminated. However, the present invention involves more than controlling pressure as a function of temperature; the present invention claims a *coordinated heat and pressure cycle* which uses multiple temperatures, pressures and time periods for a single material.

Office Action Response, Ex. 6, pp. 79-80 (emphasis added).

5. “encapsulated by” and “encapsulating”

The term “encapsulated by” or the term “encapsulating” means that the “core” must fully enclose the “electronic element” which has been placed “directly” between the “first and second plastic core sheets” so that even the sides of the “electronic element” are surrounded by the “first and second plastic core sheets”. That is, if the “electronic element” is not placed directly between the “first and second plastic core sheets” or has been already encapsulated by other material, the “first and second plastic core sheets” cannot encapsulate the “electronic element”.

Independent claims 1 and 16 in the ‘207 patent include the term “encapsulated by” and the term “encapsulating”, respectively. Claim 1 recites the term “encapsulated by” in the second step of the heat and pressure cycle:

- (ii) applying a first pressure to said core for a second period of time such that said at least one electronic element is *encapsulated by* said core;

‘207 patent, Ex. 1, col. 6, lines 32-34 (emphasis added). Claim 16 recites the term

“encapsulating” also in the second step of the heat and pressure cycle:

- (ii) applying a second pressure uniformly across said core for *encapsulating* said at least one electronic element within said controlled flow plastic;

‘207 patent, Ex. 1, col. 8, lines 26-28 (emphasis added).

The terms “encapsulated by” and “encapsulating” are not technical terms. The Leighton patents use these terms in their ordinary and customary manner. According to the Merriam-Webster dictionary, the ordinary and customary meaning of the term “encapsulate” is “to enclose in or as if in a capsule”. Webster’s Ninth New Collegiate Dictionary (1983). “Capsule” is defined by the Merriam-Webster dictionary as “**6 a** : a compact often sealed and detachable container or compartment”. *Id.* Thus, according to these dictionary definitions, when an element is “encapsulated by” something, that something fully encloses the element as if in a sealed compartment.

Indeed, the ‘685 provisional, from which the ‘207 patent claims priority, refers to encapsulation as capsulizing and describes the invention as a method of capsulizing electronics:

This invention is not the capsulized electronics (silicone computer chips and wires or circuit board antennas) but is the Hot Lamination *Method of capsulizing the electronics* in a thin ... smooth glossy ... plastic card

‘685 provisional, Ex. 5, p. 14, ¶ 4, Description of Invention (emphasis added). The ‘685 provisional refers to capsulizing micro-chips throughout the application. *See, e.g.*, ‘685 provisional, Ex. 5, p. 13, ¶ 1, Summary of the Invention (describing the card capsulizing a contactless read/write silicone computer chip and a wire or circuit board antenna); Ex. 5, p. 14, ¶ 1, Description of Invention (same).

The claim language itself is instructive for determining the element or elements that are performing the act of encapsulating or capsulizing. The term “encapsulated by” is recited in claim 1 in the limitation “at least one electronic element is encapsulated by said core”. Claim 1 recites that the “core” is formed from “said first and second plastic core sheets”. The term “encapsulating” is also recited in claim 16 in the limitation “for encapsulating said at least one electronic element within said controlled flow plastic”. Claim 16 recites the “controlled flow of said plastic which makes up said first and second plastic core sheets”. Therefore, the “electronic element” is fully enclosed by the “first and second plastic core sheets” after lamination, meaning that even the sides of the “electronic element” are surrounded by the “first and second plastic core sheets”.

The ‘207 patent specification is in accord with this ordinary and customary meaning of the terms “encapsulated by” and “encapsulating”. Figure 6, for example, illustrates that the first and second plastic core stock or sheets [30], [32] fully enclose the electronic element [20] after

lamination. That is, after lamination, the first and second plastic core sheets [30], [32] completely surround the electronic element including its sides; nothing intervenes between the core sheets and the electronic element. Moreover, the core sheets [30], [32] touch each other on all sides of the electronic element [20]. Leighton teaches that the electronic element [20] is fully enclosed by the first and second plastic core sheets [30], [32] of core [33] because the material that comprises the first and second plastic core stock [30], [32] flows during the heat and pressure cycle:

Once the heat cycle has been applied to the book 35 as is set forth above, the ram pressure of laminator 40 is increased to *facilitate the flow of the plastic core sheets 30, 32 so that the one or more electronic elements 20 are encapsulated there by*

‘207 patent, Ex. 1, col. 4, lines 48-52 (emphasis added).

In fact, Leighton disclaims any interpretation of the term “encapsulated by” that includes a material intervening between the “first and second plastic core sheets” and the “electronic element”. Leighton amended “encapsulated *in* said core” to “encapsulated *by* said core” during the prosecution of the ‘207 patent. Office Action Response, Ex. 6, p. 75 (emphasis added). Claim 1 recites that the “core” is formed from “said first and second plastic core sheets”. The plain meaning of the original claim language “encapsulated in said core” arguably includes an “electronic element” residing in a recess and being surrounded at least in part by an intervening material, such as air. The intervening material (air) encapsulates the “electronic element”. The plain meaning of the language “encapsulated by said core”, however, cannot be interpreted to include an “electronic element” being surrounded by intervening material. Rather, the “electronic element” must be completely surrounded by the plastic core sheets (“said core”) in order to be “encapsulated by said core”. Thus, the “first and second plastic core sheets” completely surround and make contact with the “electronic element” including its sides and

nothing intervenes between the “first and second plastic core sheets” and the “electronic element”.

6. “coating ... with a layer of ink”

The term “coating ... with a layer of ink” means that the ink layer must directly contact at least one of the “outer surfaces” of the “core”.

Independent claim 1 includes the term “coating ... with a layer of ink”. Claim 1 recites the coating step as follows:

(d) *coating at least one of said outer surfaces of said core with a layer of ink;*
 ‘207 patent, Ex. 1, col. 6, lines 37-38 (emphasis added).

The term “coat” is used in its ordinary and customary manner. The Merriam-Webster dictionary defines the term “coat” to mean “**2** : to cover or spread with a finishing, protecting or enclosing layer”. Webster Ninth New Collegiate Dictionary (1983). In the coating step of independent claim 1, the layer is “a layer of ink”. Therefore, according to the plain meaning of the claim language, the coating step is properly interpreted to mean the ink is spread on (or makes direct contact with) at least one of the “outer surfaces” of the “core”. As recited in the claims of the Leighton patents, “coating” does not include printing on a plastic sheet and then laminating that printed sheet to the “core”.

The specification provides further support for interpreting this coating step to mean that printing occurs directly on at least one of the “outer surfaces” of the “core”:

As mentioned, the use of matte finished laminator plates 50, 52 provide surfaces 34, 35 with a slightly roughened or textured quality which will facilitate *the application of a coating thereto* as is discussed below.

‘207 patent, Ex. 1, col. 4, lines 54-58 (emphasis added). Leighton thereafter in the specification describes “the application of a coating” as printing directly on a core surface:

Subsequent to the removal of core 33 from laminator 40, and as illustrated in FIG. 8, core 33 is *coated on* at least one of its upper and lower surfaces 34, 35 *with a layer of printing ink 36*. This may be accomplished using a wide variety of printing techniques As shown in FIG. 8, core 33 is fed in the direction indicated with arrow A through a printing press, a lithographic printer, or a similar apparatus 80. *This printing step is performed to coat at least one surface 34, 35 of core 33 with a layer of aesthetically pleasing ink 36.*

'207 patent, Ex. 1, col. 5, lines 6-17 (emphasis added). As evidenced by the above excerpts from the specification, Leighton defines the term "coat" to mean print directly on a surface.

Also evident from the specification is that Leighton did not disclose applying another layer with ink imprinted on it to an outer surface of the core itself:

This layer of ink 36 cosmetically hides the one or more electronic elements 20 that are embedded within core 33, and prevents these one or more electronic elements 20 from showing through the relatively thin core 33.

'207 patent, Ex. 1, col. 5, lines 17-21. Leighton describes the use of a "layer of ink [36]" to hide the electronic element, not another opaque layer to perform the function of hiding. Thus, this intrinsic evidence unambiguously provides that the term "coating ... with a layer of ink" means directly applying a layer of ink to at least one of the "outer surfaces" of the "core" so the layer of ink directly contacts that outer core surface or surfaces.

7. "minimal first ram pressure"

The term "minimal first ram pressure" means applying little or no pressure to the "core", but in no event a ram pressure more than about 10 pounds per square inch.

Claim 16 of the '207 patent includes in the first chronological step of the heat and pressure cycle the term "minimal first ram pressure":

- (i) heating said core in said laminator, in the presence of a *minimal first ram pressure*, to a temperature which causes controlled flow of said plastic which makes up said first and second plastic core sheets;

‘207 patent, Ex. 1, col. 8, lines 22-25 (emphasis added).

The term “minimal” is not a technical term. The Merriam-Webster dictionary defines the term “minimal” as “**1** : relating to or being a minimum : constituting the least possible in size, number, or degree” and the term “minimum” as “**1** : the least quantity assignable, admissible, or possible”. Webster Ninth New Collegiate Dictionary (1983). Therefore, according to the plain meaning of the claim language, the term “minimal first ram pressure” means the least possible first ram pressure.

This plain meaning of the term “minimal” is supported by the patent specification. In the specification, Leighton describes applying little or no ram pressure when heating the core in the laminator during the first lamination cycle:

Once book 35 is positioned in laminator 40 as shown in FIG. 7, the first lamination cycle is initiated by closing laminator platens 42, 44, preferably applying *little or no* ram pressure to book 35. A laminator heat cycle is initiated, bring the temperature of platens 42, 44 up

‘207 patent, Ex. 1, col. 4, lines 41-45 (emphasis added). In the ‘685 provisional, from which the ‘207 patent claims benefit, Leighton does not disclose the use of even a little pressure. Rather, Leighton expressly states that no pressure was applied:

The laminator begins its first heat cycle bb [sic] merely closing the laminator *without applying any pressure* to the core sheets (5). The heat is then applied After this first cycle, the ram pressure is increased

‘685 provisional, Ex. 5, p. 23, ¶2, Description of the Drawings (emphasis added). Leighton’s teaching of the application of little or no pressure is consistent with the plain meaning of the term “minimal” being the least amount possible.

The patent specifications of the ‘099 patent and the ‘367 patent shed further light on the meaning of the term “minimal first ram pressure”. Even though the claims of the ‘099 patent and

the ‘367 patent, which are a continuation-in-part of the ‘207 patent, do not include the term “minimal first ram pressure”, the specifications were supplemented to include new subject matter regarding this term. These specifications describe the same heat and pressure cycle as taught in the ‘207 patent, yet assign a preferable amount of pressure to the general language “little or no ram pressure”:

One book 35 is positioned in laminator 40 ... the first lamination cycle is initiated by closing laminator platens 42, 44, preferable applying little or no ram pressure to book 35. This is preferably done using hydraulic pressure, and a pressure *not to exceed about 10 pounds per square inch* is believed sufficient for most applications.

‘099 patent, Ex. 2, col. 5, lines 56-61; ‘367 patent, Ex. 4, col. 5, lines 59-64 (emphasis added).

Leighton therefore expressly caps the “minimal ram pressure” at “about 10 pounds per square inch”.

8. “first pressure” and “first ram pressure”, “second pressure” and “third pressure”

The terms “first pressure” and “first ram pressure” mean the very first pressure applied during the heat and pressure cycle. The term “second pressure” means the next pressure applied after the first pressure during the heat and pressure cycle. The term “third pressure” means the next pressure applied after the second pressure during the heat and pressure cycle.

Claim 1 of the ‘207 patent recites the terms “first pressure” and “second pressure”:

- (i) heating said core for a first period of time
- (ii) applying a *first pressure* to said core for a second period of time such that said at least one electronic element is encapsulated by said core;
- (iii) cooling said core while applying a *second pressure* to said core,

‘207 patent, Ex. 1, col. 6, lines 32-36 (emphasis added). Claim 16 recites the terms “first ram pressure”, “second pressure” and “third pressure”:

- (i) heating said core in said laminator, in the presence of a minimal *first ram pressure*, to a temperature which causes controlled flow of said plastic which makes up said first and second plastic core sheets;
- (ii) applying a *second pressure* uniformly across said core for encapsulating said at least one electronic element within said controlled flow plastic;
- (iii) subsequently cooling said core in conjunction with the concurrent application of a *third pressure* uniformly across said core,

‘207 patent, Ex. 1, col. 8, lines 22-32 (emphasis added). Dependent claims 6 and 7 also include the terms “first pressure” and “second pressure”.

As noted above, the use of the terms “first”, “second” and “third”, in addition to differentiating claim elements, may also indicate a serial or temporal limitation on the claim. *Applera Corp.*, 186 F. Supp. 2d at 508. Here, Leighton uses the terms “first”, “second” and “third” in his claims as more than mere identifiers of separate elements, but as descriptions of the time and sequence for applying the respective pressures.

The claim language, specification and the prosecution history of the ‘207 patent require this claim interpretation. Leighton emphasizes the time and sequence for applying the multiple pressures during the heat and pressure cycle in order to prevent damaging the “electronic element” during lamination and to accomplish his main objective of manufacturing a finished card with a sufficiently smooth surface. Claims 1 and 16 recite the first lamination step in the heat and pressure cycle as “heating [the] core”. The ‘207 patent specification describes that during this first lamination step either little or no pressure is applied:

[T]he first lamination cycle is initiated by closing laminator platens [42], [44], preferably applying *little or no ram pressure* to book [35]. A laminator heat cycle is initiated

‘207 patent, Ex. 1, col. 4, lines 41-43 (emphasis added). Leighton, therefore, describes two embodiments – an embodiment with no pressure being applied during the first lamination step and an alternative embodiment with a little pressure being applied during the first lamination step.

Leighton claims the no pressure embodiment in the first lamination step of claim 1 as “heating said core for a first period of time”; this step does not state a pressure limitation. In view of the specification, the pressure in this step must be either “little or no[ne]”. (It could not be more than a “little” or the laminator would crush the “electronic element”.) Given that the next step in the heat and pressure cycle requires a “first pressure”, the pressure in the first lamination step must be no pressure.

Claim 16 confirms this analysis. Claim 16 sets forth the first lamination step as “heating said core in said laminator, in the presence of a minimal first ram pressure”. The term “minimal” in claim 16 corresponds to the term “little” in the specification. This claim element appropriately includes a pressure limitation in accord with the alternative embodiment described by Leighton in the specification. Here, contrary to claim 1, the first lamination step has a pressure, *i.e.*, a “minimal” or a “little” pressure, confirming that the first lamination step in claim 1 has no pressure.

The specification further teaches increasing the pressure during the heat cycle:

Once the heat cycle has been applied to the book 35 as is set forth above, the ram pressure of laminator 40 is increased to facilitate the flow of the plastic core sheets

‘207 patent, Ex. 1, col. 4, lines 48-51. In the no pressure embodiment recited in claim 1, the pressure is increased from zero pressure in the first lamination step to a “first pressure” in the

second lamination step. In the alternative embodiment recited in claim 16, the pressure is increased from the “first ram pressure” in the first lamination step to the “second pressure” in the second lamination step.

After the heat cycle, the ‘207 patent teaches that the laminator applies a chill cycle during which time the ram pressure is again increased. *See* ‘207 patent, Ex. 1, col. 2, lines 37-39. In the no pressure embodiment recited in claim 1, the pressure is increased from the “first pressure” in the second lamination step to the “second pressure” in the third lamination step and in the alternative embodiment recited in claim 16 the pressure is increased from the “second pressure” in the second lamination pressure to the “third pressure” in the third lamination step. Hence, the term “second pressure” means the next pressure applied after the first pressure regardless of which step the “first pressure” is applied during the heat and pressure cycle. The term “third pressure” means the next pressure applied after the second pressure during the heat and pressure cycle again regardless of which step the “first pressure” is applied during the heat and pressure cycle. Leighton does not describe applying any additional pressure between the “first pressure”/“first ram pressure” and the “second pressure”, or between the “second pressure” and the “third pressure”. Otherwise, the “electronic element” could be damaged and Leighton’s main objective of manufacturing a card with a sufficiently smooth surface would not be achieved.

The prosecution history also supports this construction. During the prosecution of the ‘207 patent, Leighton vigorously argued that the prior art does not teach his heat and pressure sequence:

[T]here is nothing in the ‘024 patent which suggest the *heat and pressure cycle of the present invention* . . . it does not suggest *a sequence of steps* or the duration of steps . . . nor does it propose a solution to the *relative pressures to be applied* in the steps of the cycle.

Office Action Response, Ex. 6, p.79 (emphasis added). Leighton therefore stresses the importance of the sequence of the steps in the heat and pressure cycle and the particular pressure applied during those steps.

9. “controlled flow”

The term “controlled flow” means that the “first and second plastic core sheets” at least partially liquefy so to fully enclose the “electronic element” at the ram pressure and heat applied to the “core sheets” and allow the outer surfaces of the finished card before dye sublimation printing to assume a smoothness of approximately .0005 inches or better.

Claim 16 of the ‘207 patent includes the term “controlled flow”. The term “controlled flow” is recited in the first and second steps during the heat and pressure cycle:

- (i) heating said core in said laminator, in the presence of a minimum first ram pressure, to a temperature which causes *controlled flow* of said plastic which makes up said first and second plastic core sheets;
- (ii) applying a second pressure uniformly across said core for encapsulating said at least one electronic element within said *controlled flow* plastic;

‘207 patent, Ex. 1, col. 8, lines 22-28 (emphasis added).

The term “flow” is a technical term. According to the Dictionary of Scientific and Technical Terms (McGraw Hill 6th ed. 2003), the ordinary and customary meaning of the term “flow” is “[FL MECH] [t]he forward *continuous movement* of a fluid, such as gases, vapors, or *liquids*, through closed or open channels or conduits”. (emphasis added).

The specification supports the ordinary and customary meaning of the term “flow” as used in the term “controlled flow”. The specification refers to the term “controlled flow” as a transformation from a solid state to a liquid state:

A heat cycle is applied to the core sheets in the laminator thus *liquefying* or *partially liquefying* the sheets.

‘207 patent, Ex. 1, col. 2, lines 34-36 (emphasis added). The specification further describes that the purpose of the “controlled flow” is to fully enclose (encapsulate) the “electronic element”:

Once the heat cycle has been applied to the book 35 as is set forth above, the ram pressure of laminator 40 is increased to *facilitate the flow* of the plastic core sheets 30, 32 *so that* the one or more electronic elements 20 are *encapsulated* there by

‘207 patent, Ex. 1, col. 4, lines 48-52 (emphasis added). Therefore, in order that the “electronic element” is fully enclosed by the “first and second plastic core sheets”, these “plastic core sheets” at least partially liquefy in order to flow.

Leighton also describes that the purpose of the “controlled flow” is to allow the outer surfaces of the finished card before dye sublimation printing to assume a smoothness of approximately .0005 inches or better. The finished card is a plastic card with at least one overlamine layer applied to the outer surface of the “core sheets”. In the ‘685 provisional, Leighton pronounces this purpose as the main object of his invention:

The *main object* of the invention of a Hot Lamination Method of making plastic cards ... with a *smooth glossy flatness of .0005*” to receive dye sublimation printing on both sides of the card

‘685 provisional, Ex. 5, Summary of the Invention, p. 13 (emphasis added). Leighton repeatedly emphasizes this objective in the ‘685 provisional. ‘685 provisional, Ex. 5, Abstract, p. 12; Description of Invention, p. 14; Purpose of the Invention, p. 15; Field of the Invention, p. 16; Description of Prior Art, pp. 20-21. Moreover, throughout the ‘207 specification, Leighton stresses that his invention lies in producing a contactless card with a sufficiently smooth and regular surface to receive dye sublimation printing. ‘207 patent, Ex. 1, col. 1, lines 16-18; col. 2, lines 1-4; col. 2, lines 57-59; col. 6, lines 6-10. The ‘207 specification defines this smoothness as approximately .0005 inches or better. *See, e.g.*, ‘207 patent, Ex. 1, col. 6, lines 6-10. The outer

surfaces of the finished card before dye sublimation printing only assume such a smoothness of approximately .0005 inches or better if the “core sheets” at least partially liquefy and flow.

10. “cooling ... while applying a second pressure”

The term “cooling ... while applying a second pressure” means that cooling starts later than, or at the same time as, applying a second pressure.

Independent claim 1 includes, in step (c)(3) the term “cooling said core while applying a second pressure to said core”.

The term “while” is not a technical term. The Leighton patents use that term in its ordinary and customary manner. The Merriam-Webster dictionary defines the term “while” as “**1 a** : during the time that”. Webster Ninth New Collegiate Dictionary (1983).

Inserting this dictionary definition into the term, it effectively reads, “cooling said core during the time that [one is] applying a second pressure to said core.” In other words, the term “while” recited in independent claim 1 invokes a time restriction between the cooling start time and the application of a second pressure such that this limitation requires that cooling start at the same time or after applying a second pressure

In fact, the specification would seem to further limit the claim by requiring that the cooling actually begin at the same time as the second pressure. That is, in the Summary section, Leighton explains that, “A cooling cycle is then applied to the core in the laminator, preferably with an associated increase in ram pressure . . .” ‘207 patent, Ex. 1, col. 2, lines 37-40. Similarly, in describing the invention, Leighton states, “the laminator [40] is then caused to execute a chill cycle, preferably with a corresponding increase in ram pressure.” ‘207 patent, Ex. 1, col. 5, lines 50-51. Thus, Leighton explains that the chill cycle is associated with, or corresponds to, the increase in ram pressure, meaning that they occur at the same time.

Taking the claim language, the dictionary definition and the specification together, the interpretation is that cooling starts later than, or at the same time as, applying a second pressure.

11. “cooling ... in conjunction with the concurrent application of a third pressure”

The term “cooling ... in conjunction with the concurrent application of a third pressure” means that cooling starts and ends at the same time a third pressure is applied.

Independent claim 16 recites in pertinent part:

(iii) subsequently *cooling* said core *in conjunction with the concurrent application of a third pressure* uniformly across said core, said core including and upper and lower surfaces;

‘207 patent, Ex. 1, col. 8, lines 29-32 (emphasis added).

The terms “conjunction” and “concurrent” are used in the customary and ordinary manner. The Merriam-Webster dictionary provides in pertinent part that the term “conjunction” means “**2** : occurrence together in time or space”. Webster Ninth New Collegiate Dictionary (1983). Similarly, the term “concurrent” is defined as “**1** : operating or occurring at the same time”. *Id.* Therefore, according to the ordinary and customary meaning of these terms and the use of both these terms within the same limitation, the term “cooling ...in conjunction with the concurrent application of a third pressure” means that cooling and an application of a third pressure occur -- start and stop -- at the same time.

The prosecution history supports the interpretation that Leighton intended that the cooling and pressure in claim 16 both start and stop at the same time. Claim 16 was added to the ‘207 patent at the same time as step (c)(iii) of claim 1 was amended to read “cooling said core *while* applying a second pressure to said core”. Office Action Response, Ex. 6, pp. 75, 78 (emphasis added). As explained above, “while” connotes that, in Claim 1, the cooling had to start

at the same time or after the second pressure was applied. Had Leighton intended to use the same limitation in claim 16 -- that is, the cooling had to start at the same time or after the third pressure was applied -- he could have used the same word, “while,” in Claim 16. Instead, he used a limitation that included the words “concurrent” and “in conjunction.” The reason for using a different limitation in claim 16 is because he intended something different than he intended in claim 1. In claim 16, it was important to Leighton that the cooling and third pressure were “concurrent” (operating at the same time) and “in conjunction” (occurring together in time) -- meaning that they both started and stopped at the same time.

B. The ‘155 Patent

1. “electronic element”

The term “electronic element” means a micro-chip and an antenna.
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The ‘155 patent is a continuation of the ‘207 patent. Thus, as a matter of law, the specification in the two patents must be identical in all substantive respects, which they are as shown in Exhibit 11. For the same reasons stated in our discussion above with reference to the ‘207 patent, the term “electronic element” in the ‘155 patent means a micro-chip and an antenna.

The prosecution history of the ‘155 patent reinforces that construction. In his response to the USPTO dated March 24, 2000, Leighton refers to a page in the ‘155 specification for allegedly justifying his amendment that deletes the printing step from independent claim 1. In so doing, Leighton stresses that the importance of his invention is in the “advantages” in forming a plastic card that includes a computer chip embedded therein:

Applicant notes that the application of ink or otherwise coating a surface is not an essential element of the invention, and as such clarifies the non-essential nature of printing by deleting reference to it in all claims. The specification teaches broadly, at page 3, lines 16-21, that “The present invention provides numerous advantages over known plastic cards and

known plastic card manufacturing processes, including the formation of a plastic card with electronic elements such as a *computer chip* embedded therein . . .”

Office Action Response, Ex. 8, p. 63 (emphasis added). Once again, nowhere in the prosecution history or the specification is there a statement that the electronic element can exclude a micro-chip (integrated circuit).

2. “non-electronic carrier”

The term “non-electronic carrier” means a structure without any substantial electronic function, such as a recess, buffer or protective carrier, that at least partially protects during lamination the “electronic element” from damage caused by lamination pressure.

3. “directly”

The term “directly” means that there is nothing between the “electronic element” and the first plastic core sheet and nothing between the “electronic element” and the second plastic core sheet.

4. “comprising the steps of”

The term “comprising the steps of” means the respective steps must be performed in a precise order.

When we were discussing the ‘207 patent above, we interpreted the terms “non-electronic carrier”, “directly” and “comprising ... the steps of”. Our interpretations were based on the claim language, dictionary definitions, the language in the specification and the prosecution history. Since the ‘155 patent is a continuation of the ‘207 patent, the law requires that their specifications be identical. Exhibit 11 verifies this fact. Also claims 1 and 15 of the ‘155 patent are identical to claims 1 and 16 of the ‘207 patent, except that the claims of the ‘155 patent do not include a printing step. Moreover, the dictionary definitions are the same since Leighton uses the same exact terms in both patents. And, because the ‘155 patent is a continuation, the prosecution history of the ‘207 patent may be relied on for purposes of interpreting the ‘155 patent. *Microsoft Corp.*, 357 F.3d at 1350. Thus, the terms “non-electronic carrier”, “directly”

and “comprising the steps of” in independent claims 1 and 15 of the ‘155 patent should also have the same construction as set forth above for the ‘207 patent.

The prosecution history of the ‘155 patent reinforces our interpretation of the terms “non-electronic carrier” and “directly”. As he did during the prosecution of the ‘207 patent, Leighton disclaimed providing *any protection* for an “electronic element” during lamination. During the prosecution of the ‘155 patent, Leighton added the limitation “in the absence of a non-electronic carrier” and added the term “directly” to application claim 1 before the term “between”.

Leighton also added a new application claim 15 with both of these limitations. By making these changes, Leighton relinquished any interpretation of these terms that includes any protection of an “electronic element” or anything else that intervenes between the “electronic element” and the “first and second plastic core sheets”. *See Southwall*, 54 F.3d at 1576.

5. “encapsulated by” or “encapsulating”

The term “encapsulated by” or the term “encapsulating” means that the “core” must fully enclose the “electronic element” which has been placed “directly” between the “first and second plastic core sheets” so that even the sides of the “electronic element” are surrounded by the “first and second plastic core sheets”. That is, if the “electronic element” is not placed directly between the “first and second plastic core sheets” or has been already encapsulated by other material, the “first and second plastic core sheets” cannot encapsulate the “electronic element”.

We interpreted the terms “encapsulated by” or “encapsulating” in the ‘207 patent based on the claim language, dictionary definitions, and language in the specification and prosecution history. As shown in Exhibit 11, and required by law, the ‘155 patent specification is identical in all substantive respects to the ‘207 patent. Also claims 1 and 15 of the ‘155 patent are identical to claims 1 and 16 of the ‘207 patent, except that the claims of the ‘155 patent do not include a printing step, a step that is irrelevant to the interpretation of the terms “encapsulated by” or “encapsulating”. And of course the dictionary definitions do not change. Moreover, the

prosecution history of the '207 patent may be relied on for purposes of interpreting the '155 patent, a continuation patent of the '207 patent. *Microsoft Corp.*, 357 F.3d at 1350. Thus, the terms “encapsulated by” or “encapsulating” recited in independent claims 1 and 15 of the '155 patent should have the same construction as set forth above for the '207 patent.

Also, as he did with the '207 patent, during the prosecution of the '155 patent, Leighton amended the term “encapsulated *in* said core” to “encapsulated *by* said core”. Office Action Response, Ex. 8 , p. 59 (emphasis added). As discussed on page 47, *supra*, Leighton disclaimed any interpretation of the term “encapsulated by” that includes anything between the “first and second plastic core sheets” and the “electronic element”. *See Southwall*, 54 F.3d at 1576.

6. “minimal first ram pressure”

<p>The term “minimal first ram pressure” means applying little or no pressure to the “core”, but in no event a ram pressure more than about 10 pounds per square inch.</p>
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7. “first pressure” and “first ram pressure”, “second pressure” and “third pressure”

<p>The terms “first pressure” and “first ram pressure” mean the very first pressure applied during the heat and pressure cycle. The term “second pressure” means the next pressure applied after the first pressure during the heat and pressure cycle. The term “third pressure” means the next pressure applied after the second pressure during the heat and pressure cycle.</p>

8. “controlled flow”

<p>The term “controlled flow” means that the “first and second plastic core sheets” at least partially liquefy so to fully enclose the “electronic element” at the ram pressure and heat applied to the “core sheets” and allow the outer surfaces of the finished card before dye sublimation printing to assume a smoothness of approximately .0005 inches or better.</p>

9. “cooling ...in conjunction with the concurrent application of a third pressure”

<p>The term “cooling ... in conjunction with the concurrent application of a third pressure” means that cooling starts and ends at the same time a third pressure is applied.</p>

10. “cooling ... while applying a second pressure”

The term “cooling ... while applying a second pressure” means that cooling starts later than, or at the same time as, applying a second pressure.

In connection with the ‘207 patent, we interpreted these terms based on claim language, dictionary definitions, the language in the specification and prosecution history. The terms “minimal first ram pressure”, “controlled flow”, “cooling ...in conjunction with the concurrent application of a third pressure” recited in claim 15 of the ‘155 patent, “cooling ... while applying a second pressure” recited in claim 1 of the ‘155 patent, and, “first pressure” and “first ram pressure”, “second pressure” and “third pressure” recited in claims 1 and 15, and in dependent claims 6 and 7, appear in the claims of the 155 patent in precisely the same way as in the claims of the ‘207 patent. The dictionary definitions are the same since it is the same exact terms in both patents. The specification, as a matter of law, must be identical in all substantive respects to that in the ‘207 patent because the ‘155 was a continuation of the’207 patent. Furthermore, because the ‘155 patent is a continuation, the prosecution history of the’207 may be relied on for purposes of interpreting the ‘155 patent. Microsoft Corp., 357 F.3d at 1350. Accordingly, with respect to all of these elements, they have the same construction as set forth above for the ‘207 patent.

The prosecution history of the ‘155 patent does not contain anything that is inconsistent with our interpretation of these terms.

C. The ‘099 Patent

1. “electronic element”

The term “electronic element” is ambiguous and cannot be defined.

Independent claim 1 of the ‘099 patent, like claim 1 of the’207 patent, uses repeatedly the term “electronic element”. ‘099 patent, Ex. 2, col. 8, lines 49-67; col. 9, lines 1-5. In fact, with

the exception of subsection (e), which is new, this claim is a verbatim copy of claim 1 of the '207 patent. As described in Section IV(A)(1) above, in the '207 patent, it is clear that "electronic element" means a micro-chip and an antenna and that both are encapsulated directly between two core sheets. Because of the similarity of the two claims, there is reason to believe that the term should have the same meaning in the '099 patent as in the '207 patent. For example, the Abstract of the '207 patent uses the language "including a micro-chip embedded therein" to indicate that the micro-chip is laminated between the two core sheets. The fact that the Abstract of the '099 patent uses exactly the same language provides a basis for saying that, in the '099 patent as well, the micro-chip must be laminated between the two cores sheets.

Other language from the '099 patent also supports the conclusion that the patent relates to embedded micro-chips. For example, Leighton talks about how he is trying to solve the existing problem of "plastic cards with *embedded computer chips* and electronics". '099 patent, Ex. 2, col. 2, lines 25-26 (emphasis added). He goes on to assert that the advantage of his invention over the existing manufacturing processes "includes the formation of a plastic card with electronic elements such as a *computer chip embedded* therein". '099 patent, Ex. 2, col. 3, lines 36-38 (emphasis added). And, in describing his invention, Leighton says that it relates to a "hot lamination process for the manufacturer of plastic cards that include an electronic element, such as a *computer chip* or other electronic element *embedded therein*". '099 patent, Ex. 2, col. 4, lines 11-15 (emphasis added).

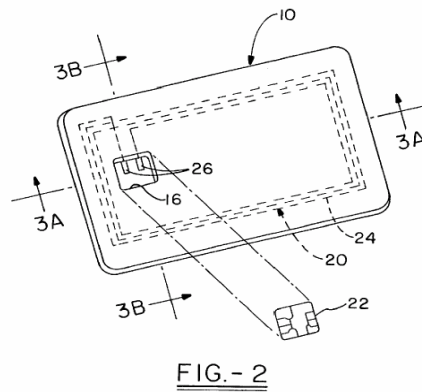
Also relevant are the dependent claims, which specifically define the "electronic element" as a particular type of micro-chip and a particular type of an antenna. Thus, dependent claim 15 recites "wherein said at least one electronic element is a micro-chip and an associated

circuit board antenna or an associated wire antenna” and dependent claim 16 recites “wherein said at least one electronic element is a read/write integrated chip and an associated antenna”. ‘099 patent, Ex. 2, col. 10, lines 22-24, 27-28.

The prosecution history of the ‘367 patent sheds further light on the definition of this term. Leighton asserted that the invention recited in the independent claims solves the problem of forming a laminated card with *embedded computer chips* and electronics and pointed to specific language in the ‘367 specification. Office Action Response, Ex. 9, p. 117. The ‘099 patent has exactly the same specification language that Leighton relied on in support of his assertion. Thus, it is apparent that the ‘099 patent also solved the problem of forming a laminated card with *embedded computer chips*.

For all these reasons, there is a basis for concluding that, in the ‘099 patent, the “electronic element” that is laminated between the two core sheets includes a micro-chip.

On the other hand, there are aspects of the ‘099 patent that lead to the conclusion that the encapsulated electronic element does not include a micro-chip. Most notably, in Figure 2, it is clear that the micro-chip [22] is not embedded between the two core sheets but is inserted into the window [16] and joined to the contact pads [26] in order to be connected to the antenna [24].



In sum, one is unable to define “electronic element” in this claim based on the inconsistent intrinsic evidence.

2. “non-electronic carrier”

The term “non-electronic carrier” means a structure without any substantial electronic function, such as a recess, buffer or protective carrier, that at least partially protects during lamination the “electronic element” from damage caused by lamination pressure.

The term “non-electronic carrier” in independent claim 1 of the ‘099 patent should have the same construction as set forth above for the ‘207 patent. The ‘099 patent specification, like the ‘207 patent specification, is devoid of any reference to protecting the “electronic element” during lamination. Additionally, the element in which this term appears in claim 1 of the ‘099 patent is identical to the element in claim 1 of the ‘207 patent.

The prosecution history of the ‘099 patent reinforces our interpretation of this term. Leighton made the same arguments during the prosecution of the ‘099 patent that he made during the prosecution of the ‘207 patent. Indeed, in order to distinguish the ‘024 prior art patent in his arguments to the Examiner for the ‘099 patent, Leighton “cut and pasted” the arguments (quoted and discussed above on page 24) that he made during the prosecution of the ‘207 patent.

Office Action Response, Ex. 7, pp. 79-80. These arguments stressed the lack of any need for protecting the “electronic element” due to the controlled use of a heat and pressure cycle.

Accordingly, Leighton disclaimed that the phrase “in the absence of a non-electronic carrier” permits any interpretation which includes any type of protection for the “electronic element”. *See Southwall*, 54 F.3d at 1576.

3. “directly”

The term “directly” means that there is nothing between the “electronic element” and the first plastic core sheet and nothing between the “electronic element” and the second plastic core sheet.

The term “directly” in independent claim 1 of the ‘099 patent should have the same construction as set forth above for the ‘207 patent and for the same reasons. For the sake of brevity, we will repeat those arguments here in abbreviated form and respectfully refer the Court to the more detailed discussion commencing on page 25 above.

Independent claim 1 of the ‘099 patent provides:

- (b) positioning said at least one electronic element in the absence of a non-electronic carrier *directly* between said first and second plastic core sheets to form a core . . . ;

’099 patent, Ex. 2, col. 8, lines 55-56 (emphasis added).

The prosecution history of the ‘099 patent demonstrates that the term “directly” means that there is nothing between the “electronic element” and either the first or second “plastic core sheets”. Indeed, the term was added for the specific purpose of making this point and in an effort to distinguish the invention from the prior art.

Independent claim 1, as filed, used the following language:

positioning at least one electronic element between said first and second plastic core sheets to form a layered core;

‘099 patent application, Ex. 7, p. 35. After rejection by the Examiner based on the ‘024 patent, Leighton amended the claim and narrowed this limitation:

positioning said at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets to form a [layered] core, said plastic core sheets defining a pair of inner and outer surfaces of said core;

Office Action Response, Ex. 7 p. 74.

In this Office Action response, Leighton “cut and pasted” the same language quoted above on page 24. He explained that the ‘024 prior art patent describes an electronic element that was first placed in a recess so as to avoid damage to the electronic element from localized pressure applied in the lamination process and required that a “buffer zone” be present within the recess. Leighton explained that his invention was different because the “electronic element” was placed “directly” between the “core sheets” and did not require protection:

The controlled use of a heat and pressure cycle of the present invention eliminates the requirement of both a protective carrier disk for the electronic element and/or a recess or other buffer zone formed in one or more of the card layers for carrying and protecting the electronic element. The process of the present invention allows the electronics-containing core to be subjected to the full laminating pressure without use of a recess in a card layer. Unlike anything shown in the prior art, the electronic unit is placed *directly* between two (2) plastic sheets.

Office Action Response, Ex. 7, pp. 79-80 (emphasis added).

There should be no doubt that this distinction of the ‘024 patent on grounds that the ‘099 patent required that the electronic element be “directly” between the core sheets was critical to the Examiner’s decision. Indeed, the Examiner referred to this issue in his Notice of Allowability when declaring his reason for allowing claim 1 of the ‘099 patent:

No prior art or reasonable combination of art was found to overcome the limitation of the electronic unit being place [sic] *directly* between two plastic sheets.

Notice of Allowability, Ex. 7, p. 85 (emphasis added). As in the '207 patent and the '155 patent, by adding the term "directly" to claim 1 before the term "between" and narrowing his invention, Leighton relinquishes any interpretation of the term "directly" that includes something between the "electronic element" and either the first or second "plastic core sheets". *See Southwall*, 54 F.3d at 1576

4. "comprising the steps of"

The term "comprising the steps of" means the respective steps must be performed in a precise order.

Commencing on pages 28, we explained why, in connection with the '207 patent, the term "comprising the steps of" should be interpreted to mean that the respective steps must be performed in a precise order. Those same arguments apply here.

Like the '207 patent, the '099 patent uses the words "comprising the steps of", and the same case law referred to above applies here. Leighton again precedes the elements of independent claim 1 with letters and roman numerals, i.e., (a), (b), (c), (i), (ii), (iii), (d) and (e), indicating the ordering of the steps for incorporating an "electronic element" in a plastic card. Furthermore, if the steps are not followed in the enumerated order, a plastic card is not manufactured that satisfies Leighton's stated main objective -- manufacturing a plastic card with a sufficiently smooth surface to receive dye sublimation printing.

In addition, as was the case with the '207 patent, the specification confirms this interpretation because it specifically describes the order in which the different steps must be taken. For instance, when describing the heat and pressure cycle (the lamination), Leighton sets

forth the required timing of one step in relation to another: “*Subsequent to* placing one or more electronic elements [20] between the first and second sheets [30, 32] of plastic core stock to form a core [33],” ‘099 patent, Ex. 2, col. 5, lines 36-38 (emphasis added); “*Once book [35] is positioned* in laminator [40] as shown in FIG. 5, the first lamination cycle is initiated by closing laminator platens [42, 44]” ‘099 patent, Ex. 2, col. 5, lines 56-58 (emphasis added); “*Once the heat cycle has been applied* to the book [35]” ‘099 patent, Ex. 2, col. 6, line 5 (emphasis added); and “*Subsequent to the above heat cycle*, laminator [40] applies a chill cycle to book [35]” ‘099 patent, Ex. 2, col. 6, lines 35-36 (emphasis added). The specification also expressly describes that the coating/printing step is performed after the core is laminated with the heat and pressure cycle recited in the claims:

Subsequent to the removal of core 33 from laminator 40, ... core 33 is coated on at least one of it’s upper and lower surfaces 34, 35 with a layer of printing ink 36.

‘099 patent, Ex. 2, col. 6, lines 45-48 (emphasis added).

The prosecution history confirms that the steps in the Leighton patent claims must be performed in the recited sequence. During the prosecution of the ‘099 patent, Leighton represented that the prior art did not teach the order of his claim steps, as well as the sub-steps within the heat and pressure cycle, and asserted that the sequence of claim steps was thus patentable.

The ‘024 [prior art] patent merely discusses the variation of pressure with temperature, it does not suggest *a sequence of steps* or the duration of steps which might be used to encapsulate an electronic element by a plastic card.

Office Action Response, Ex. 7, pp. 80 (emphasis added).

5. “encapsulated by” and “encapsulating”

The term “encapsulated by” or the term “encapsulating” means that the “core” must fully enclose the “electronic element” which has been placed “directly” between the “first and second plastic core sheets” so that even the sides of the “electronic element” are surrounded by the “first and second plastic core sheets”. That is, if the “electronic element” is not placed directly between the “first and second plastic core sheets” or has been already encapsulated by other material, the “first and second plastic core sheets” cannot encapsulate the “electronic element”.

Claim 1 of the ‘099 patent uses the term “encapsulated by” in the identical manner as does claim 1 of the ‘207 patent. Thus, as we will explain, the arguments stated there apply equally here.

Claim 1 recites the term “encapsulated by” in the second step of the heat and pressure cycle:

- (ii) applying a first pressure to said core for a second period of time such that said at least one electronic element is *encapsulated by* said core;

‘099 patent, Ex. 2, col. 8, lines 63-65 (emphasis added). The term “encapsulated by” is not a technical term. The ordinary and customary meaning of the term “encapsulate” is “to enclose in or as if in a capsule”. Webster’s Ninth New Collegiate Dictionary (1983).

In connection with the ‘207 patent, we explained in the discussion commencing on page 30 above that the claim language and specification demonstrated that the patent used the term “encapsulated by” in accordance with its ordinary meaning. As shown in Exhibit 10, the specification and claim language relied on for that argument is the same in the ‘099 patent. Thus, the same argument applies here.

And, not surprisingly, as he had done in the prosecution of the ‘207 patent, Leighton disclaimed any interpretation of the term “encapsulated by” that includes anything intervening between the “first and second plastic core sheets” and the “electronic element”. Leighton

amended “encapsulated *in* said core” to “encapsulated *by* said core”. Office Action Response, Ex. 7, p. 74 (emphasis added). See *supra*, p. 33 for further discussion of this issue.

6. “coating ... with a layer of ink”

The term “coating ... with a layer of ink” means that the ink layer must directly contact at least one of the “outer surfaces” of the “core”.

Once again, the ‘099 is for all relevant purposes identical to the ‘207 patent with respect to this term and, thus, the same arguments apply. Independent claim 1 includes the term “coating ... with a layer of ink”.

(d) *coating* at least one of said outer surfaces of said core *with a layer of ink*; ‘099 patent, Ex. 2, col. 9, lines 1-2 (emphasis added).

The Merriam-Webster dictionary defines the term “coat” to mean “**2** : to cover or spread with a finishing, protecting or enclosing layer”. Webster Ninth New Collegiate Dictionary (1983). In the coating step of independent claim 1, the layer is “a layer of ink”. Therefore, according to the plain meaning of the claim language, the coating step is properly interpreted to mean the ink is spread on (or makes direct contact with) at least one of the “outer surfaces” of the “core”.

In addition, as shown in the document comparison in Exhibit 10, the intrinsic evidence of the ‘099 patent is, in all material respects, the same as the intrinsic evidence of the ‘207 patent relied on in the discussion on page 34 above. Thus, as we concluded there, the term “coat” is used in its ordinary and customary manner and the term “coating ... with a layer of ink” means directly applying a layer of ink to at least one of the “outer surfaces” of the “core” so the layer of ink directly contacts that outer core surface or surfaces.

7. “first pressure” and “second pressure”

The term “first pressure” means the very first pressure applied during the heat and pressure cycle. The term “second pressure” means the next pressure applied after the first pressure during the heat and pressure cycle.

Mirroring claim 1 of the ‘207 patent, claim 1 of the ‘099 patent recites the terms “first pressure” and “second pressure”:

(ii) applying a *first pressure* to said core for a second period of time such that said at least one electronic element is encapsulated by said core;

(iii) cooling said core while applying a *second pressure* to said core,

‘099 patent, Ex. 2, col. 8, lines 63-67 (emphasis added). Also as in the ‘207 patent, dependent claims 6 and 7 of the ‘099 patent include the terms “first pressure” and “second pressure”.

We previously explained that the use of the terms “first”, “second”, “third”, et cetera may indicate a serial or temporal limitation on a claim. *See Applera Corp.*, 186 F. Supp. 2d at 508. As demonstrated in our discussion *supra*, p. 38. Leighton used the terms “first” and “second” as more than mere identifiers of separate elements, but as descriptions of the time and sequence for applying the respective pressures. Leighton uses his specific time and sequence for applying the multiple pressures during the heat and pressure cycle in order to prevent damaging the “electronic element” during lamination and to accomplish his main objective of manufacturing a finished card with a sufficiently smooth surface. Because of the identity of pertinent specification and claim language, the discussion, *supra*, p. 38, is equally applicable here.

8. “cooling ... while applying a second pressure”

The term “cooling ... while applying a second pressure” means that cooling starts later than, or at the same time as, applying a second pressure.

Independent claim 1 includes the term “cooling said core while applying a second pressure to said core”. The same arguments made in connection with the ‘207 patent apply here as well.

The term “while” is not a technical term and the Leighton patents use the term in its ordinary and customary manner. The ordinary dictionary meaning of “while” is “during the time that”. Webster Ninth New Collegiate Dictionary (1983). Inserting this dictionary definition into the term, it effectively reads, “cooling said core during the time that [one is] applying a second pressure to said core.” In other words, the term “while” recited in independent claim 1 invokes a time restriction between the cooling start time and the application of a second pressure such that this limitation requires that cooling start at the same time or after applying a second pressure.

In fact, the specification would seem to further limit the claim by requiring that the cooling actually begin at the same time as the second pressure. That is, in the Summary section, Leighton explains that, “A cooling cycle is then applied to the core in the laminator, preferably with an associated increase in ram pressure . . .” ‘099 patent, Ex. 2., col. 3, lines 2-5. Similarly, in describing the invention, Leighton states, “the laminator [40] is then caused to execute a chill cycle, preferably with a corresponding increase in ram pressure.” ‘099 patent, Ex. 2., col. 7, lines 27-28. Thus, Leighton explains that the chill cycle is associated with, or corresponds to, the increase in ram pressure, meaning that they occur at the same time.

Taking the claim language, the dictionary definition and the specification together, the interpretation is that cooling starts later than, or at the same time as, applying a second pressure.

D. The ‘367 Patent

1. “electronic element”

The term “electronic element” is ambiguous and cannot be defined.

The ‘367 patent is a continuation of the ‘099 patent and therefore the specifications are legally required to be identical. Moreover, the term “electronic element” is used in the identical

manner as in claims 1 and 20 of the '099 patent. Thus, for the same reasons that we explained in our discussion of the meaning of "electronic element" in the '099 patent, that term in the '367 patent is ambiguous and cannot be defined.

2. "non-electronic carrier"

The term "non-electronic carrier" means a structure without any substantial electronic function, such as a recess, buffer or protective carrier, that at least partially protects during lamination the "electronic element" from damage caused by lamination pressure.

3. "directly"

The term "directly" means that there is nothing between the "electronic element" and the first plastic core sheet and nothing between the "electronic element" and the second plastic core sheet.

In connection with the '099 patent, our interpretation of these two element was based on the claim language, dictionary definitions, the language of the specification and the prosecution history. Claims 1 and 20 use these terms in the same way as does claim 1 of the '099 patent: "positioning at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets". The dictionary definitions we referred to in the '099 argument are the same. The specification, as a matter of law, must be identical in all substantive respects to that in the '099 patent because the '367 was a continuation of the '099 patent. Furthermore, because the '367 patent is a continuation, the prosecution history of the '099 may be relied on for purposes of interpreting the '155 patent. *Microsoft Corp.*, 357 F.3d at 1350. Accordingly, with respect to both of these elements, they have the same construction as set forth above for the '099 patent.

Indeed, it is only logical that the definition be the same. We have previously explained, see Sections IV(A), (B), and (C), the manner in which the terms "non-electronic carrier" and "directly" came to be included in the three earlier patents. Leighton added these terms in

response to the Examiner's rejection over the '024 prior art patent and explained that the inventiveness of his process was that it permitted the electronic element to be placed directly between the card stock without any protective devices. By the time Leighton filed the '367 application, he had already been required to amend the '207 and '099 patents to overcome the '024 prior art reference. Thus, with the benefit of that knowledge, he included in the original '367 patent application the terms "directly" and "non-electronic carrier" but they obviously have the same purpose and meaning as Leighton described for his other three patents.

5. "encapsulated by"

The term "encapsulated by" or the term "encapsulating" means that the "core" must fully enclose the "electronic element" which has been placed "directly" between the "first and second plastic core sheets" so that even the sides of the "electronic element" are surrounded by the "first and second plastic core sheets". That is, if the "electronic element" is not placed directly between the "first and second plastic core sheets" or has been already encapsulated by other material, the "first and second plastic core sheets" cannot encapsulate the "electronic element".

6. "first pressure" and "second pressure"

The term "first pressure" means the very first pressure applied during the heat and pressure cycle. The term "second pressure" means the next pressure applied after the first pressure during the heat and pressure cycle.

7. "cooling ... while applying a second pressure"

The term "cooling while applying a second pressure" means that cooling starts later than or at the same time as applying a second pressure.

In connection with the '099 patent, we interpreted these terms based on claim language, dictionary definitions, the language in the patent and its prosecution history. Because of the identical content, both in the specifications and claims, that the '099 patent shares with the '207 patent, we also relied on the language and prosecution history of the '207 patent.

The dictionary definitions remain the same. The specification of the '367 patent, as a matter of law, must be identical in all substantive respects to that in the '099 patent because the

'367 is a continuation of the '099 patent. Claims 1 and 20 of the '367 patent use the terms "encapsulated by", "first pressure" and "second pressure", and "cooling ... while applying a second pressure" in the identical fashion as does claim 1 of the '099 patent. Furthermore, because the '367 patent is related to the '207 and '099 patents, the prosecution history of those patents may be relied on for purposes of interpreting the '155 patent. *Microsoft Corp.*, 357 F.3d at 1350. Accordingly, with respect to all of these elements, they have the same construction as set forth above for the '207 patent.

V. Conclusion

For the reason set forth herein, Oberthur respectfully requests that the Court interpret the Leighton patents in accordance with the specific claim element interpretations set forth in Appendix A to this brief.

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Appendix A -- Summary of Claim Interpretations

<u>Claim Element</u>	<u>Interpretation</u>
“electronic element” (‘207 and ‘155 patents)	a micro-chip and an antenna
“electronic element” (‘099 and 367 ‘patents)	the term is ambiguous and cannot be defined.
“non-electronic carrier”	a structure without any substantial electronic function, such as a recess, buffer or protective carrier, that at least partially protects during lamination the “electronic element” from damage caused by lamination pressure
“directly”	there is nothing between the “electronic element” and the first plastic core sheet and nothing between the “electronic element” and the second plastic core sheet.
“comprising the steps of”	the respective steps must be performed in a precise order.
“encapsulated by” or “encapsulating”	the “core” must fully enclose the “electronic element” which has been placed “directly” between the “first and second plastic core sheets” so that even the sides of the “electronic element” are surrounded by the “first and second plastic core sheets”. That is, if the “electronic element” is not placed directly between the “first and second plastic core sheets” or has been already encapsulated by other material, the “first and second plastic core sheets” cannot encapsulate the “electronic element”.
“coating...with a layer of ink”	the ink layer must directly contact at least one of the “outer surfaces” of the “core”.
“minimal first ram pressure”	applying little or no pressure to the “core”, but in no event a ram pressure more than about 10 pounds per square inch.

“first pressure”, “first ram pressure”, “second pressure”, “third pressure”	The terms “first pressure” and “first ram pressure” mean the very first pressure applied during the heat and pressure cycle. The term “second pressure” means the next pressure applied after the first pressure during the heat and pressure cycle. The term “third pressure” means the next pressure applied after the second pressure during the heat and pressure cycle.
“controlled flow”	the “first and second plastic core sheets” at least partially liquefy so to fully enclose the “electronic element” at the ram pressure and heat applied to the “core sheets” and allow the outer surfaces of the finished card before dye sublimation printing to assume a smoothness of approximately .0005 inches or better.
“cooling ... while applying a second pressure”	cooling starts later than, or at the same time as, applying a second pressure.
“cooling ... in conjunction with the concurrent application of a third pressure”	cooling starts and ends at the same time a third pressure is applied

Appendix B -- The Leighton Patents

In this section, we describe each Leighton patent and its corresponding prosecution history. Often in the following text claim language is underlined and bracketed. When the USPTO examined the Leighton patents, the practice was for the patent applicant to indicate additions to patent claims by underlining the added material and to indicate deletions from patent claims by enclosing the deleted material in square brackets. Additionally, although a patent application bears a different number than the corresponding issued patent, for ease of comprehension, we use the issued patent number to also refer to the application from which it issued. However, we distinguish a claim recited in an application from a claim in the corresponding patent by referring to the former as an “application claim”. To further promote readability, we have placed all numbers referring to elements in the Leighton patents in square brackets and in a reduced font.

A. The ‘207 Patent

1. Specification

The ‘207 patent claims the benefit of U.S. Provisional Patent Application No. 60/005,685 (‘685 provisional”) filed on October 17, 1995. ‘207 patent, Ex. 1, col. 1, lines 6-8. The ‘207 patent discloses a contactless card having at least one electronic element “such as a computer chip or other electronic element embedded therein.” ‘207 patent, Ex. 1, col. 3, lines 29-34. Leighton refers to the contactless card as a radio frequency identification (“RFID”) plastic card when describing the contactless card and its manufacturing process in the patent specification.

In the ‘685 provisional application, Leighton represents that the main object of his invention is producing a plastic card having a smooth surface for receiving dye sublimation printing:

The *main object* of the invention of a Hot Lamination Method of making plastic cards ... with a *smooth glossy flatness of .0005*” to receive dye sublimation printing on both sides of the card

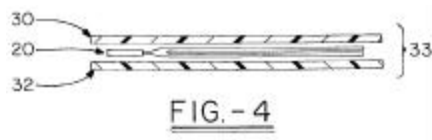
‘685 provisional, Ex. 5, Summary of the Invention, p. 13. (Emphasis added). The ‘685 provisional repeatedly emphasizes this objective, distinguishing this objective from prior art. *See* ‘685 provisional, Ex. 5, Abstract, p. 12; Description of Invention, p. 14; Purpose of the Invention, p. 15; Field of the Invention, p. 16; Description of Prior Art, p. 18-19. Leighton describes dye sublimation printing in his ‘685 provisional, from which the ‘207 patent claims benefit, as a technique for printing on the card surface itself:

Dye sublimation printing is a method of printing *on the surface of* individual *plastic cards* (one card at a time) using a computer printer and a video camera.

‘685 provisional, Ex. 5. p. 14, ¶2, Description of Invention. (Emphasis added). Not surprisingly, throughout the ‘207 specification, Leighton also stresses that his invention lies in producing a contactless card with a sufficiently smooth and regular surface that can receive dye sublimation printing. *See* ‘207 patent, Ex. 1, col. 1, lines 16-18; col. 2, lines 1-4; col. 2, lines 57-59; col. 6, lines 6-10. The ‘207 patent defines this smoothness as approximately .0005 inches or better. *See, e.g.*, ‘207 patent, Ex. 1, col. 6, lines 6-10.

Leighton’s contactless cards are manufactured “by positioning an electronic element [20] between first and second sheets of card stock [30], [32] to form a core [33].” ‘207 patent, Ex. 1,

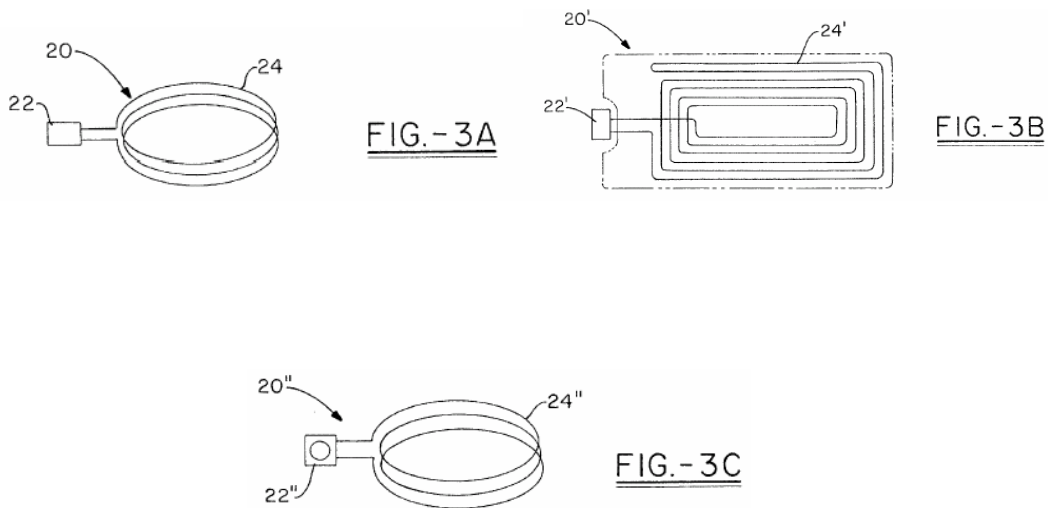
col. 4, lines 1-2. Figure 4 of the '207 patent depicts this structure having the electronic element [20]:



The '207 specification effectively defines the electronic element [20] to a micro-chip and an antenna:

As shown in FIG. 3A-3C respectively, electronic element 20, 20', 20'' may be provided by *a micro-chip 22 including a wire antenna 24 connected thereto, a micro-chip 22' and a circuit board antenna 24', a read/write micro-chip 22'' and a wire coil antenna 24'', or any other suitable electronic element.*

'207 patent, Ex. 1, col. 3, lines 47-52. (Emphasis added). Figures 3A in the '207 patent illustrates the electronic element [20] and Figures 3B and 3C further limit the “electronic element” to a micro-chip and an antenna:



The specification refers to the first and second sheets of card stock also as plastic core sheets. Examples of plastic core sheets are “polyvinyl chloride (PVC) having a thickness in the

range of 0.007 inches to 0.024 inches,” (‘207 patent, Ex. 1, col. 4, lines 13-14), or other plastics that may include “polyester, acrylonitrile-butadiene-styrene (ABS), and any other suitable plastic.” ‘207 patent, Ex. 1, col. 4, lines 20-21.

“Subsequent to placing one or more electronic elements [20] between the first and second sheets [30], [32] of plastic core stock to form a core [33], this core [33] is placed in a laminator apparatus [40].” ‘207 patent, Ex. 1, col. 4, lines 22-25. The laminator apparatus, which Leighton also calls a “laminator”, is of the type well-known in the art of plastic card manufacturing and includes a pair of plates (“platens”) for applying pressure to the core [33] and providing “both heat and chill cycles”. ‘207 patent, Ex. 1, col. 4, lines 25-32.

The ‘207 patent teaches a lamination method that positions the core between a pair of laminating plates. Then, the ‘207 patent instructs that a pair of laminating pads are positioned outside of the laminating plates and a pair of steel plates are positioned outside the pair of laminating pads. An assembly that includes the core, the pair of laminating plates, the pair of laminating pads and the pair of steel plates “forms a book [35] [misabeled as reference numeral 37 in Figure 7] for being positioned in laminator [40] between platens [42], [44].” ‘207 patent, Ex. 1, col. 4, lines 38-40. Figure 7 shows the construction of the book and the laminator:

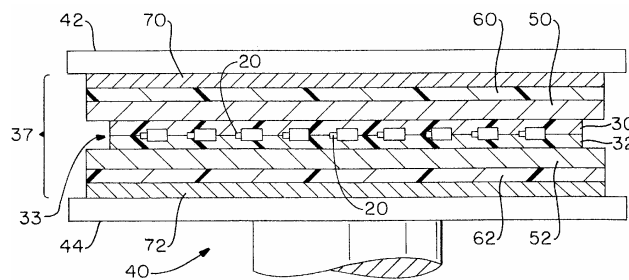


FIG. - 7

With the book positioned in the laminator “the first lamination cycle is initiated by closing laminator platens [42], [44], preferably applying little or no ram pressure to book [35].” ‘207 patent, Ex. 1, col. 4, lines 41-44. Then, “[a] laminator heat cycle is initiated, bringing the temperature of platens [42], [44] up to a range of 275° F. to 400° F., and most preferably up to a range of 300° F. to 370° F. for a period of greater than 5 minutes, and preferably in the range of 7 to 10 minutes.” ‘207 patent, Ex. 1, col. 4, lines 44-48. After applying the heat cycle, “the ram pressure of laminator [40] is increased to facilitate the flow of the plastic core sheets [30, 32] so that the one or more electronic elements [20] are encapsulated thereby, and so that sheets [30, 32] form a uniform core [33].” ‘207 patent, Ex. 1, col. 4, lines 48-54. The laminator then applies a chill cycle “during which time the ram pressure of the laminator [40] is increased, preferably by approximately 25% until the platens [42, 44] have cooled to approximately 40° F. to 65° F. for approximately 10-15 minutes.” ‘207 patent, Ex. 1, col. 5, lines 1-3.

The laminated core is then removed for additional processing. Using known printing techniques, Leighton coats the outer surface of the core with a layer of ink to prevent the encapsulated electronic element from showing through the core:

This layer of ink [36] cosmetically hides the one or more electronic elements [20] that are embedded within core [33], and prevents these one or more electronic elements [20] from showing through the relatively thin core [33]. In this manner, the one or more electronic elements [20] encapsulated in core [33] are completely hidden from view without requiring the plastic used in the manufacture core [33] to be excessively thick.

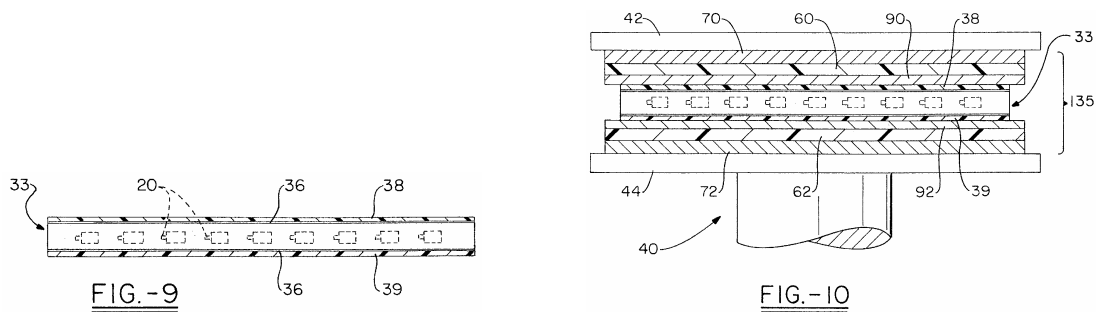
‘207 patent, Ex. 1, col. 5, lines 17-24. The specification thus associates the printing step with the main objective of the ‘207 patent: to manufacture an aesthetically pleasing plastic card “with a

surface suitable for receiving dye sublimation printing”, yet still meeting the industry standards.

‘207 patent, Ex. 1, Abstract; col. 2, lines 9-13; col. 2, lines 53-61.

As a “final processing of core [33], which now comprises a layer of ink [36],” Leighton positions a “layer of overlamine film” on the ink coated surface of the core. ‘207 patent, Ex. 1, col. 5, lines 28-30. A “core [33], including at least one layer of ink [36] and at least one layer of overlamine film [38], [39] is positioned between laminating plates”. ‘207 patent, col. 5, lines 34-37. Leighton once again forms a book: a sandwich comprising outer laminating pads and laminating plates between the pair of laminating pads. ‘207 patent, Ex. 1, col. 5, lines 37-41.

Figures 9 and 10 depict the construction of the core, the book and the laminator:



A second lamination cycle then begins. Upon “book [135]” having been inserted between the platens [42], [44], the laminator closes and applies “a heat cycle in the range of 175° F. to 300° F., and most preferably in the range of 180° F. to 275 ° F., . . . to book [135] for a period of 10 to 25 minutes with a ram pressure.” ‘207 patent, Ex. 1, col. 5, lines 42-47. “The laminator [40] is then caused to execute a chill cycle, preferably with a corresponding increase in ram pressure.” ‘207 patent, Ex. 1, col. 5, lines 50-51.

The second lamination cycle produces a laminated “sheet of plastic card stock . . . which comprises at least core [33] with at least one surface [34], [35] thereof covered by a layer of ink [36], and with at least one surface [34], [35] thereof covered by a layer of overlamine film [38], [39].” ‘207 patent, Ex. 1, col. 5, lines 57-62. One or more cards [10] is then cut from the resulting plastic card stock. The resulting cards are “sufficiently smooth and regular to receive dye sublimation printing” and thus satisfy Leighton’s main objective. ‘207 patent, Ex. 1, col. 6, lines 9-10.

2. Claims

The ‘207 patent includes two independent claims, claim 1 and claim 16. Claim 1, “a process for incorporating at least one electronic element in the manufacture of a plastic card”, comprises the following steps:

- (a) providing first and second plastic core sheets;
- (b) positioning said at least one *electronic element* in the absence of a *non-electronic carrier directly* between said first and second plastic core sheets to form a core, said plastic core sheets defining a pair of inner and outer surfaces of said core;
- (c) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle, said heat and pressure cycle *comprising the steps of*:
 - (i) heating said core for a first period of time;
 - (ii) applying a *first pressure* to said core for a second period of time such that said at least one *electronic element* is *encapsulated by* said core;
 - (iii) *cooling* said core *while applying a second pressure* to said core,
- (d) *coating* at least one of said outer surfaces of said core *with a layer of ink*; and
- (e) applying a layer of overlamine film to at least one of said outer surfaces of said core.

‘207 patent, Ex. 1, col. 6, lines 38-40. (Emphasis added).

Independent claim 16 recites a “hot lamination process for the manufacture of plastic cards” and comprises the following steps:

- (a) providing first and second plastic core sheets;
- (b) positioning at least one *electronic element* in the absence of a *non-electronic carrier directly* between said first and second plastic core sheets to form a layered core;
- (c) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle, said heat and pressure cycle *comprising the steps of*:
 - (i) heating said core in said laminator, in the presence of a *minimal first ram pressure*, to a temperature which causes *controlled flow* of said plastic which makes up said first and second plastic core sheets;
 - (ii) applying a *second pressure* uniformly across said core for *encapsulating* said at least one *electronic element* within said *controlled flow* plastic;
 - (iii) subsequently *cooling* said core *in conjunction with the concurrent application of a third pressure* uniformly across said core, said core including and upper and lower surfaces;
- (d) printing on at least one of said upper and lower surfaces of said core such that a layer of ink is applied to at least a portion of said at least one upper and lower surface of said core.

‘207 patent, Ex. 1, col. 8, lines 12-37. (Emphasis added).

The remaining claims that depend from claims 1 and 16 recite further detailed features of the elements recited in independent claims 1 and 16.

3. Prosecution History

Leighton filed the application that matured into the ‘207 patent on October 7, 1996 with 22 claims and claimed the benefit of the ‘685 provisional filed on October 17, 1995. Thus, the ‘207 patent has an effective filing date of October 17, 1995.

The USPTO mailed an Office Action on September 8, 1997. In the Office Action, the Examiner restricted the originally filed claims of the '207 patent into two groups of inventions (application claims 1-19 and application claims 20-22) and then required Leighton to "elect" one invention. Under U.S. patent statute 35 U.S.C. §121 and under U.S. federal patent rule 37 CFR §1.141, a patent applicant can claim only one independent and distinct invention in one application. If an applicant claims two or more independent and distinct inventions in one application, the USPTO "restricts" the application and requires the applicant to "elect" which invention the applicant wants to pursue. In the same Office Action the Examiner indicated that during a telephone conversation on July 30, 1997 Leighton had elected to prosecute the invention recited in application claims 1-19. Because application claims 20-22 were not elected, the Examiner withdrew application claims 20-22 from consideration.

The Examiner also rejected application claims 9-21 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,450,024 ("the '024 patent") issued to Haghiri-Tehrani et al. Although the Office Action rejected application claims 9-21, since application claims 20-22 had been withdrawn, the Examiner apparently meant to reject application claims 1-19. The Examiner's rejection concluded that the lamination process and the printing step are not patentable:

As to sole pending independent claim 1, the reference teaches a lamination process for making an electronic card, see the abstract. Although the reference does not specify the application of a printing layer in the manner recited in the claim, absent any evidence to the contrary, it would have been obvious to one of ordinary skill in the art to apply any layer to those already present in the card during lamination, the application of a printed layer being considered exemplary.

Office Action, Ex. 6, p.69.

Leighton submitted a response dated January 8, 1998 that amended application claims 1-8 and 11-18, deleted application claims 6, 9, 10 and 19, and added new application claims 23 and 24. Application claim 1 was narrowed to recite an unprotected “electronic element in the absence of a non-electronic carrier” positioned “directly” between “first and second plastic core sheets” and a timed heat and pressure sequence:

1. (Amended) A [hot lamination] process for incorporating at least one electronic element in the manufacture of a plastic card, [said process] comprising the steps of:

- (a) providing first and second plastic core sheets;
- (b) positioning said at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets to form a [layered] core, said plastic core sheets defining a pair of inner and outer surfaces of said core;
- (c) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle, said heat and pressure cycle comprising the steps of:
 - (i) heating said core [in said laminator,] for a first period of time;
 - (ii) [thereafter] applying [ram] a first pressure to said core for a second period of time such that said at least one electronic element is encapsulated [in] by said core[,];
 - (iii) [and thereafter] cooling said core [in conjunction with laminator ram] while applying a second pressure [being applied] to said core[, said core including an upper and lower surfaces],
- (d) [printing on] coating at least one of said [upper and lower] outer surfaces of said core [such that] with a layer of ink [is applied to said at least one upper and lower surface of said core]; and
- (e) [positioning said core in a laminator apparatus with a layer of overlamine film on at least one of said upper and lower surfaces of said core and laminating said] applying a layer of overlamine film to at least one of said outer surfaces of said core [in said laminator to thereby form a sheet of plastic card stock; and,
- (f) cutting at least one card from said sheet of plastic card stock].

Office Action Response, Ex. 6, pp. 74-75.

Leighton argued that the '024 prior art patent does not teach the process of the '207 patent. Leighton asserted for the first time that his claimed heat and pressure cycle eliminates the need for any protective structures such as a recess, a buffer zone, or a protective carrier:

The '024 patent claims a lamination process for making an electronic card which protects the electronic element of the card by first placing it in a *recess* formed within a card layer so as to avoid damage to the electronic element from localized pressure applied in the lamination process. The patent then requires that a "*buffer zone*" be present within the *recess*. Even the broadest of claims of the '024 patent require a *recess* and a *buffer zone*, for and protecting the electronic element. These are required by the '024 invention in order to enable the card assembly to be subjected to a full laminating pressure.

No such *protective elements* are desired or necessary to the invention of the present application. Further, the invention taught by the '024 patent requires that the electronic element also be placed in a *protective carrier disk* (6), which is subsequently located within the *recess*.

The controlled use of a heat and pressure cycle of the present invention eliminates the requirement of both a *protective carrier disk* for the electronic element and/or a *recess or other buffer zone* formed in one or more of the card layers for carrying and protecting the electronic element. The process of the present invention allows the electronics-containing core to be subjected to the full laminating pressure without use of a recess in a card layer. Unlike anything shown in the prior art, the electronic unit is placed directly between two (2) plastic sheets.

Office Action Response, Ex. 6, p. 79. (Emphasis added).

In a Notice of Allowability dated April 13, 1998, the Examiner allowed all the pending claims without explanation. Notice of Allowability, Ex. 6, pp.81-82.

B. The '099 Patent**1. Specification**

The application that matured into the '099 patent is a continuation-in-part of the application that matured into the '207 patent. We attach a copy of the '099 patent as Exhibit 2 and a copy of a document comparison of the '207 patent and the '099 patent as Exhibit 10. We generated this document comparison, and the other document comparisons attached to this brief, by downloading from the USPTO web site the respective patent, running the downloaded patent through a computer program that stripped the file of all HTML tags and comparing the resulting file using the commercially available Delta View program.

Whereas the '207 patent is directed to a contactless card and a hot lamination process for the manufacture of the same, the '099 patent relates to a combination contact/contactless dual function card and a hot lamination process for manufacturing such dual function cards. Despite the fact that the patents purportedly relate to different types of cards, the specifications of the '207 and the '099 patents virtually share the same disclosure. For instance, despite teaching that “due to the presence of both internal and surface electronics within the card, the manufacture of a dual function card presents its own unique set of obstacles and problems, different from the manufacture of cards with fully embedded electronics”, ('099 patent, Ex. 2, col. 2, lines 37-41), the hot lamination processes described in the '099 patent and the '207 patent are the same.

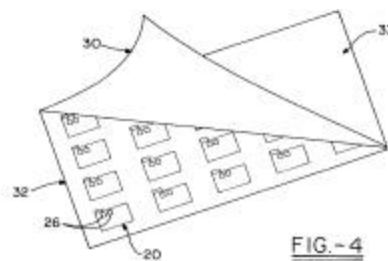
Like in the '207 patent, Leighton stresses in the '099 patent specification that his invention is manufacturing a plastic card with a sufficiently smooth outer surface on which to dye sublimation print. *See* '099 patent, Ex. 2, col. 1, lines 10-16; col. 2, lines 21-24, 26-36; col. 3, lines 38-42. To achieve this same objective, the '099 patent specification teaches the same

steps for embedding the electronic element in a core, positioning the core in the laminator apparatus and applying the identical heat and pressure sequence.

The '099 patent exemplifies the electronic element [20] as a micro-chip and an antenna:

Referring now to FIGS. 1, 2, and 2A there can be seen a plastic card 10 manufactured in accordance with the present invention and including an electronic element, generally 20, embedded therein. Card 10 includes an upper surface 12 and a lower surface 14. Electronic element 20 may take a wide variety of forms (microprocessor chip, circuit board, transponder, etc.) and perform a wide variety of functions. As shown in FIGS. 2, 2A, and 3A, *electronic element 20 may comprise a read/write micro-chip 22 including a wire antenna 24 connected thereto*, any other suitable electronic element.

'099 patent, Ex. 2, col. 4, lines 31-41. (Emphasis added). The specification teaches positioning “an electronic element [20], including contact points [26], between first and second sheets of card stock [30, 32] to form a core [33].” '099 patent, Ex. C, col. 4, lines 15-17. Figure 4 shows this card construction:



Using the same method that Leighton teaches in the '207 patent, Leighton constructs a book comprising a sandwich of core [33], first and second laminating plates [50,52], first and second laminating pads [60, 62] outside the first and second laminating plates [50, 52], and first and second steel plates [70,72] outside the first and second laminating pads [60, 62]. The book is

placed into laminator [40] between platens [42, 44]. '099 patent, Ex. 2, col. 5, lines 37-54; *see also* Fig. 5 and Fig. 5A.

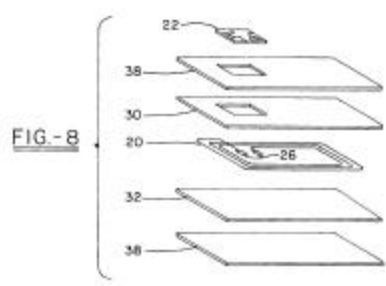
“[B]y closing laminator platens [42, 44], preferably applying little or no ram pressure to book [35]”, Leighton initiates the first lamination cycle. '099 patent, Ex. 2, col. 5, lines 57-59. Leighton recommends using hydraulic pressure that does not exceed about 10 pounds per square inch. He then commences the heat cycle “bringing the temperature of platens [42, 44] up to a range of 275° F. to 400° F., and most preferably up to a range of 300° F. to 370° F. for a period of ranging between 1 to 20 minutes, but preferably greater than 5 minutes, and most preferably in the range of 7 to 10 minutes for PVC material.” '099 patent, Ex. 2, col. 5, lines 62-67.

After applying the heat cycle, “the ram pressure of laminator [40] is increased to facilitate the flow of the plastic core sheets [30, 32] so that the one or more electronic elements [20] become encapsulated thereby, and so that sheets [30, 32] form a uniform core [33] with upper and lower surfaces [34, 35].” '099 patent, Ex. 2, col. 6, lines 6-10. Leighton adds that the “ram pressure translates into an effective pressure on core [33] in the range of 200 to 450 psi and preferably in the range of 250 to 350 psi.” '099 patent, Ex. 2, col. 6, lines 10-13.

The laminator then applies a chill cycle “during which time the ram pressure of the laminator [40] is increased, preferably by approximately 10-40% and most preferably about 25% until the platens [42, 44] have cooled . . . to approximately 40° F. to 65° F. for approximately 10-15 minutes.” '099 patent, Ex. 2, col. 6, lines 36-43.

Leighton removes the core [33] from the laminator [40]. Using known printing techniques, Leighton coats the outer surface of the core with a layer of printing ink to prevent the electronic element from showing through the core.

Leighton then suggests a final step. He sandwiches the printed core [33] between sheets of overlamine film. Leighton once again constructs a book containing the sandwiched core in the same manner he formed the book in the first laminating cycle. Leighton places the book in the laminator [40] between the upper and lower platens [42, 44] and closes the laminator [40]. The '099 specification describes applying to the book "a heat cycle in the range of 175° F. to 300° F. . . . for a period of 10 to 25 minutes." '099 patent, Ex. 2, col. 7, lines 17-20. "The laminator [40] is then caused to execute a chill cycle, preferably with a corresponding increase in ram pressure." '099 patent, Ex. 2, col. 7, lines 27-28. The resulting card includes "core [33] covered on both surfaces [34, 35] with a layer of ink [36] which is positioned between layers of overlamine film [38, 39], all of which has been laminated together as described and as shown in FIG. 8":



'099 patent, Ex. 2, col. 7, lines 53-57.

The '099 specification additionally discloses that the card's upper surface [12] contains a window [16] formed to expose contact pads [26] connected to an antenna [24]. Leighton inserts a microprocessor chip [22] into the window [16] and electrically connects the microprocessor chip [22] to the contact pads [26]. "This microprocessor chip may function as a 'proximity' or radio frequency identification (RFID) card in conjunction with antenna [24] when electromagnetically used with a compatible terminal reader." '099 patent, Ex. 2, col. 4, lines 56-60. "Microprocessor

chip [22] is also capable of function [sic] as a contact card, requiring physical contact between a compatible terminal reader and the surface of chip [22].” ‘099 patent, Ex. 2, col. 4, lines 60-63.

2. Claims

The ‘099 patent has two independent claims, claims 1 and 17. Claim 1 is the same as claim 1 in the ‘207 patent except that element (e) in the ‘207 patent, which recites the overlamine application step, is replaced with a milling step. Since Leighton has not alleged that Oberthur infringes claim 17, we do not discuss claim 17, the corresponding text from the specification and the associated prosecution history.

3. Prosecution History

Leighton filed the application that matured into the ‘099 patent on August 19, 1997 with 24 claims as a continuation-in-part of the application that matured into the ‘207 patent.

As in the ‘207 patent, the Examiner in the ‘099 patent determined that the claims as filed are not patentable. In an Office Action dated November 18, 1998, the Examiner rejected all 24 claims under 35 U.S.C. §103(a) as being unpatentable over the same ‘024 prior art patent in view of several other U.S. patents. In the ‘207 patent, another Examiner also relied on the ‘024 prior art patent when rejecting the claims as filed. The Examiner in the ‘099 patent concluded that the prior art taught all the elements that Leighton claimed.

Leighton responded by amending application claims 1, 3-6, 8-9, 12-16, 18-19 and 21, and deleting application claims 2, 7, 10, 20, 23 and 24. As amended, independent application claim 1 required an unprotected electronic element and a timed heat and pressure sequence. Indeed,

Leighton amended elements (a), (b) and (c) in application claim 1 of the '099 patent in the same manner in which he amended elements (a), (b) and (c) in application claim 1 of the '207 patent:

1. (Amended) A [hot lamination] process for incorporating at least one electronic element in the manufacture of a plastic card, [said process] comprising the steps of:
 - (a) providing first and second plastic core sheets;
 - (b) positioning said at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets to form a [layered] core[;], said plastic core sheets defining a pair of inner and outer surfaces of said core;
 - (c) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle; said heat and pressure cycle comprising the steps of:
 - (i) heating said core [in said laminator,] for a first period of time;
 - (ii) [thereinafter] applying a first pressure to said core for a second period of time such that said at least one electronic element is encapsulated [in] by said core[,];
 - (iii) [and thereafter] cooling said core [in conjunction with laminator ram] while applying a second pressure [being applied] to said core[, said core including an upper and lower surfaces];
 - (d) [printing on] coating at least one of said [upper and lower] outer surfaces of said core [such that] with a layer of ink [is applied to said at least one upper and lower surface of said core;
 - (e) cutting at least one card from said sheet of plastic card stock.];
 - (f) milling a region of said core to a controlled depth so as to form a cavity which exposes at least one contact pad of said electronic element.

Office Action Response, Ex.7, p.74. Also, as amended, independent application claim 21 required an unprotected electronic element and a timed heat and pressure sequence:

21. (Amended) A [hot lamination] process for incorporating at least one electronic element having at least one electronic subcomponent in the manufacture of a plastic card, comprising the steps of:

- (a) providing first and second plastic core sheets, at least one core sheet having a cavity formed therein;
- (b) positioning said at least one electronic element [having at least one electronic subcomponent] in the absence of a non-electronic carrier between said first and second plastic core sheets to form a layered core, said plastic core sheets defining a pair of inner and outer surface of said core, and said cavity positioned so as to expose said at least one [contact pad] electronic subcomponent therein;
- (c) inserting a spacer into said cavity, said spacer substantially filling said cavity and covering said at least one electronic subcomponent;
- (d) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle, said heat and pressure cycle comprising the steps of:
 - (i) heating said core [in said laminator] for a first period of time;
 - (ii) [thereafter] applying a first [ram] pressure to said core for a second period of time such that said at least one electronic element is encapsulated [in] by said core[.];
 - (iii) [and thereafter] cooling said core [in conjunction with laminator ram] while applying a second pressure [being applied] to said core[, said core including an upper and lower surfaces];
- (e) [printing on] coating at least one of said [upper and lower] outer surfaces of said core [such that] with a layer of ink[is applied to at least one upper and lower surface of said core];
- (f) removing said spacer from the cavity of said core[;
- (g) cutting at least ~~one~~ card from said sheet of plastic card stock.].

Office Action Response, Ex. 7, p. 77.

Conceding the Examiner's position of no patentability, Leighton once again focused on a specific heat and pressure cycle that eliminates the need for any protection of the "electronic element", the identical argument, word for word, that Leighton asserted during the prosecution of the '207 patent:

The '024 patent claims a lamination process for making an electronic card which protects the electronic element of the card by first placing it in a

recess formed within a card layer so as to avoid damage to the electronic element from localized pressure applied in the lamination process. The patent then requires that a “buffer zone” be present within the recess. Even the broadest of claims of the ‘024 patent require a recess and a buffer zone, for and protecting the electronic element. These are required by the ‘024 invention in order to enable the card assembly to be subjected to a full laminating pressure.

No such protective elements are desired or necessary to the invention of the present application. Further, the invention taught by the ‘024 patent requires that the electronic element also be placed in a protective carrier disk (6), which is subsequently located within the recess.

The controlled use of a heat and pressure cycle of the present invention eliminates the requirement of both a protective carrier disk for the electronic element and/or a recess or other buffer zone formed in one or more of the card layers for carrying and protecting the electronic element. The process of the present invention allows the electronics-containing core to be subjected to the full laminating pressure without use of a recess in a card layer. Unlike anything shown in the prior art, the electronic unit is placed directly between two (2) plastic sheets.

Office Action Response, Ex. 7, pp.79-80.

Following that response, the Examiner allowed all the pending claims in the Notice of Allowability dated April 8, 1999. The Examiner relied on Leighton’s argument that his process did not require the electronic element to be protected. He explained that “[n]o prior art or reasonable combination of art was found to overcome the limitation of the electronic unit being place [sic] directly between two plastic sheets.” Notice of Allowability, Ex. 7, p. 85.

C. The ‘155 Patent

1. Specification

As a continuation of the ‘027 application, the law dictates that in all substantive respects, the ‘155 patent specification duplicate the ‘207 patent specification. Like the ‘207 patent, the ‘155 patent claims the benefit of the ‘685 provisional filed on October 17, 1995 in which

Leighton repeatedly emphasized that the main object of his invention is to produce a plastic card having a smooth surface for receiving dye sublimation printing. We attach a copy of the ‘155 patent as Exhibit 3 and a computer generated document comparison of the ‘207 patent and the ‘155 patent as Exhibit 11.

2. Claims

The ‘155 patent includes two independent claims, claims 1 and 15. Claim 1 is directed to a “process for incorporating at least one electronic element in the manufacture of a plastic card” and comprises the following steps:

- (a) providing first and second plastic core sheets;
- (b) positioning said at least one *electronic element* in the absence of a *non-electronic carrier directly* between said first and second plastic core sheets to form a core, said plastic core sheets defining a pair of inner and outer surfaces of said core;
- (c) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle, said heat and pressure cycle *comprising the steps of*:
 - (i) heating said core for a first period of time;
 - (ii) applying a *first pressure* to said core for a second period of time such that said at least one *electronic element* is *encapsulated by* said core;
 - (iii) *cooling* said core *while applying a second pressure* to said core,
- (d) applying a layer of overlamine film to at least one of said outer surfaces of said core.

‘155 patent, Ex. 3, col. 6, lines 18-38. (Emphasis added).

The similarities between the ‘155 patent and the ‘207 patent do not end with the respective specifications. Claim 1 of the ‘155 patent is identical to claim 1 of the ‘207 patent,

except that claim 1 of the '155 patent omits the coating step. Claim 15 is directed to a "hot lamination process for the manufacture of plastic cards" and comprises the following steps:

- (a) providing first and second plastic core sheets;
- (b) positioning at least one *electronic element* in the absence of a *non-electronic carrier directly* between said first and second plastic core sheets to form a layered core;
- (c) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle, said heat and pressure cycle *comprising the steps of*:
 - (i) heating said core in said laminator, in the presence of a *minimal first ram pressure*, to a temperature which causes *controlled flow* of said plastic which makes up said first and second plastic core sheets;
 - (ii) applying a *second pressure* uniformly across said core for *encapsulating* said at least *one electronic element* within said *controlled flow* plastic;
 - (iii) subsequently *cooling* said core *in conjunction with the concurrent application of a third pressure* uniformly across said core, said core including and upper and lower surfaces.

'155 patent, Ex. 3, col. 8, lines 8-28. (Emphasis added). Claim 15 of the '155 patent is the same as claim 16 of the '207 patent, except that claim 15 of the '155 patent omits the printing step.

As in the '207 patent, the remaining claims, which depend from claims 1 and 15, recite additional detailed features of the elements recited in the independent claims 1 and 15.

3. **Prosecution History**

Leighton filed the '155 application that matured into the '155 patent on September 22, 1998 with 22 claims as a continuation of the application that matured into the '207 patent. Thus, the specification and the claims of the '155 patent as originally filed on September 22, 1998 are a copy of the specification and the claims of the '207 patent as originally filed.

As in the '207 patent, the Examiner found multiple inventions in the originally filed claims: application claims 1-19 drawn to a hot lamination process; and application claims 20-22 drawn to a plastic card. On June 11, 1999, the Examiner mailed an Office Action requiring Leighton to elect one of the two inventions. Leighton elected to prosecute the invention recited in application claims 1-19 on June 30, 1999.

The Examiner issued another Office Action on September 27, 1999. In an apparent oversight, the Examiner rejected all of the elected claims under 35 U.S.C. §103(a) as being unpatentable over Leighton's own '207 patent, a rejection clearly not proper under 35 U.S.C. §103(a).

On March 24, 2000, Leighton replied by deleting application claims 6, 9, 10, 13, 14 and 19, amending application claims 1-5, 7-8, 11-12 and 15-18, and adding new application claims 23 and 24. Leighton narrowed application claim 1 to recite an unprotected electronic element and a timed heat and pressure sequence. He also deleted the printing, overlamine application and cutting steps:

1. (Amended) A [hot lamination] process for incorporating at least one electronic element in the manufacture of a plastic card, [said process] comprising the steps of:
 - (a) providing first and second plastic core sheets;
 - (b) positioning said at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets to form a [layered] core, said plastic core sheets defining a pair of inner and outer surfaces of said core;
 - (c) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle, said heat and pressure cycle comprising the steps of:
 - (i) heating said core [in said laminator,] for a first period of time;

- (ii) [thereinafter] applying [ram] a first pressure to said core for a second period of time such that said at least one electronic element is encapsulated [in] by said core[.];
- (iii) [and thereafter] cooling said core [in conjunction with laminator ram] while applying a second pressure [being applied] to said core[, said core including an upper and lower surfaces].
- (d) [printing on at least one of said upper and lower surfaces of said core such that a layer of ink is applied to said at least one upper and lower surface of said core;
- (e) positioning said core in a laminator apparatus with a layer of overlamine film on at least one of said upper and lower surfaces of said core and laminating said] applying a layer of overlamine film to at least one of said outer surfaces of said core [in said laminator to thereby form a sheet of plastic card stock; and,
- (f) cutting at least one card from said sheet of plastic card stock.].

Office Action Response Ex. 8, pp. 58-59. Unsurprisingly, elements (a), (b) and (c) of application claim 1 were amended the same as elements (a), (b) and (c) in application claim 1 of the '207 patent and application claim 1 of the '099 patent. Leighton also added the following new independent claim 23 that again required an unprotected electronic element and a timed heat and pressure sequence:

23. (new) A hot lamination process for manufacture of plastic cards, said process comprising the steps of:

- (a) providing first and second plastic core sheets;
- (b) positioning at least one electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets to form a layered core;
- (c) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle, said heat and pressure cycle comprising the steps of:
 - (i) heating said core in said laminator, in the presence of a minimal first ram pressure, to a temperature which causes controlled flow of said plastic which makes up said first and second plastic core sheets;

- (ii) applying a second pressure uniformly across said core for encapsulating said at least one electronic element within said controlled flow plastic;
- (iii) subsequently cooling said core in conjunction with the concurrent application of a third pressure uniformly across said core, said core including and upper and lower surfaces.

Office Action Response, Ex. 8, p.62.

In the Office Action response, Leighton noted that the '155 application is a continuing application of the '207 patent, and thus the '207 patent legally cannot be prior art against the '155 application. Leighton also justified deleting the printing step by asserting that the process of printing a layer of ink on an outer surface of the core is not an essential element of his invention. Rather, Leighton stressed that the main objective of the invention is the formation of a sufficiently smooth and regular outer surface of the finished plastic card to receive such dye sublimation printing:

Applicant have [sic] amended the claims to delete reference to a printing or coating step in the process, as indicated in amended claim 1. Applicant notes that the application of ink or otherwise coating a surface is not an essential element of the invention, and as such clarifies the non-essential nature of printing by deleting reference to it in all claims. The specification teaches broadly, at page 3, lines 16-21, that 'The present invention provides numerous advantages over known plastic cards and known plastic card manufacturing processes, including *the formation of a plastic card with electronic elements such as a computer chip embedded therein with a pleasing aesthetic appearance, with a sufficiently smooth and regular surface such that the card may receive dye sublimation printing*, and with sufficient durability and characteristics to comply with all industry specifications and standards.'

Office Action Response, Ex. 8, pp.63-64. (Emphasis added).

The Examiner allowed the pending claims in a Notice of Allowability dated June 5, 2000.

D. The '367 Patent**1. Specification**

Since the '367 patent is a continuation of the '099 patent, the same similarities and differences between the '099 patent and the '207 patent discussed above also exist between the '367 patent and the '207 patent. Moreover, since the '367 patent is a continuation of the '099 patent, the law required that the specifications of the two patents should be substantially identical. However, they are not. For instance, the text in column 8, lines 48-50 is new to the '367 patent specification: "For example, it should be understood that the methods as described can be performed with or without the printing or coating steps and still fall within the scope of the invention." Because these differences do not affect our claim interpretations, we do not discuss them further. We attach a copy of the '367 patent as Exhibit 4, a document comparison of the '099 patent and the '367 patent as Exhibit 12 and a document comparison of the '207 patent and the '367 patent as Exhibit 13.

Like the '207 patent and the '155 patent, the '367 patent claims the benefit of the '685 provisional in which Leighton repeatedly emphasized that the main object of his invention is to produce a plastic card having a smooth surface for receiving dye sublimation printing. The '367 patent further claimed the benefit of U.S. Provisional Patent Application No. 60/024,255 ("255 provisional") filed on August 21, 19096. The '255 provisional also continually stresses Leighton's main objective of a smooth surface. *See* '255 provisional, Ex. 16.

2. Claims

The '367 patent includes two independent claims, claims 1 and 20. Claim 1 is a copy of claim 1 in the '099 patent, except that claim 1 in the '367 patent omits step (e), the coating step, and adds to cooling step (c)(iii), "the second pressure being at least 10% greater than the first pressure". Claim 20 recites the same elements as recited in claim 1 of the '099 patent, except the milling step, element (e).

3. Prosecution History

Leighton filed the application that matured into the '367 patent on August 5, 1999 with 24 claims as a continuation of the application that matured into the '099 patent. The specification of the '367 patent filed on August 5, 1999 is virtually the same as the specification of the '099 patent.

Significantly, all the originally filed claims contained the limitations "non-electronic carrier" and "directly" that Leighton had to add to his earlier applications (the '207 patent, the '155 patent and the '099 patent) to achieve their allowance. Independent application claim 1 of the '367 patent as originally filed is identical to claim 1 of the '099 patent, except that application claim 1 of the '367 patent omits step (d), the coating step. Also, except for an omitted coating step (d) and an omitted overlamine application step (e), independent application claim 20 of the '367 patent as originally filed is identical to claim 1 of the '099 patent. Thus, by omitting these limitations, the claims in the '367 patent are broader than the claims in the earlier Leighton patents.

In an Office Action dated December 6, 2000, the Examiner restricted the claims as filed into two inventions pursuant to 35 U.S.C. §121: application claims 1-19 and application claims 22-24 drawn to a method of laminating a chip bearing card; and application claims 20 and 21 drawn to a laminated card. The Examiner further restricted application claims 1-19 and application claims 22-24 drawn to a method of laminating a chip bearing card into two distinct species: application claims 1-17, 23 and 24 drawn to the species where the recess was formed via a milling operation; and application claims 18-19 and 22 drawn to the species where the recess was preformed and maintained with a spacer during the laminating operation. The Office Action required Leighton to elect one invention, and if Leighton elected the invention recited in application claims 1-19 and application claims 22-24, to also elect a single disclosed species for prosecution on the merits. In the same Office Action, the Examiner noted that during a previous telephone conversation Leighton had provisionally elected the species of milling out the recess for the contacts, application claims 1-17, 23 and 24. Thus, the Examiner withdrew application claims 18-22 from consideration as being drawn to a non-elected invention.

The Examiner rejected application claims 1-17, 23 and 24 under 35 U.S.C. §112, second paragraph and rejected application claim 11 under 35 U.S.C. §101 (statutory type double patenting provision) as reciting the same invention set forth in application claim 1 of the '099 patent. Further, under the judicially created doctrine of obviousness type double patenting, the Examiner rejected application claims 1-17, 23 and 24 as being unpatentable over claims 1-16 of the '099 patent and rejected application claims 1-17, 23 and 24 as being unpatentable over claims 1-17 of the '207 patent in view of U.S. Patent No. 5,519,201 ("Templeton, Jr. et al."). He

reasoned that the '207 patent claimed "essentially the same invention", except the milling step, and Templeton Jr. et al. taught forming a contact hole by milling.

Notably, unlike the previous Examiner that examined the '099 patent, this Examiner uncovered prior art for rejecting the same elements recited in the '367 application that are recited in the '099 patent, the '207 patent and the '155 patent. The Examiner rejected application claims 1, 4-10 and 14-17 under 35 U.S.C. §103(a) as being unpatentable over newly discovered Japanese Patent 6-176214 (the "Japanese Patent") in view of UK 2,279,610 ("UK '610") and Templeton, Jr. et al., optionally further taken with UK 2,225,283 ("UK '283"). According to the Examiner, the Japanese Patent teaches all the steps of the claims, except for the cooling and the milling steps; however, UK '610 teaches the cooling step and Templeton, Jr. et al. teaches the milling step. The Examiner further rejected the claims over UK '283 as disclosing the claimed heat and pressure cycle. Also, under 35 U.S.C. §103(a), the Examiner rejected application claims 2, 3, 11-13, 23 and 24 as being unpatentable over the references set forth above further taken with UK 2,294,899 ("UK '899") as teaching the claimed matte finish.

In explaining the rejections, the Examiner repeatedly refers not to an "electronic element" recited in the '367 patent, but to a "chip" or an "integrated circuit". For instance, citing the Japanese Patent, the Examiner states:

Japanese Patent '214 taught a process for forming a smart card which included the steps of laminating with heat and pressure an assembly which included an IC *chip* 11 and a thin coil 12 (an antennae).

Office Action, Ex. 9, pp.70-71. (Emphasis added). Also, while explaining the process disclosed in the UK '610 patent, the Examiner refers to an "integrated circuit" not being damaged:

The reference to UK '610 suggested that one skilled in the art would have interposed a printed circuit 11 with reinforced elements 19 between two

outer sheets 37 and 38 of thermoplastic in the PVC family with interposed polyester layers coated with thermally activated catalyst adhesive and the assembly was disposed between pressing plates. The assembly was heated and then pressure applied to the same in order to encapsulate the electrical components of the card. . . The reference made clear that in order to avoid damaging the *integrated circuit* which was being encapsulated that one would have heated the assembly, then applied heat and pressure to the assembly in the press and then cooled the assembly while pressure was maintained. Clearly, one viewing the same would have understood that heat and pressure as well as cooling under pressure would have been performed when laminating the card with the *integrated circuit* therein . . . One skilled in the art would have optimized the specific pressure used in order to achieve a good bond without disrupting the ability of the circuit to operate properly.

Office Action, Ex. 9, pp. 71-72. (Emphasis added). Further, when referring to the UK ‘283 patent, the Examiner again concentrates on an “integrated circuit”:

UK ‘283 is manufacturing an *integrated circuit* card where the assembled layers (which included thin plastic layers which had printing on the layers as well as in *integrated circuit* therein) were laminated together in a press.

Office Action, Ex. 9, p.73. (Emphasis added). A still further example of the Examiner referring to an “integrated circuit” is when the Examiner cites the UK ‘899 patent:

However, in the art of manufacturing a smart card where an *integrated circuit* was disposed within the card, it was known at the time the invention was made to provide the exterior of the card with a matte finish where the same was provided by employed pressing plates which had a matte finish thereon to reduce special reflection . . .

Office Action, Ex.9, p.74. (Emphasis added).

Because Leighton did not respond to the above Office Action within the statutorily allowed time limit, the USPTO mailed a Notice of Abandonment on July 20, 2001. On February 13, 2002, Leighton submitted a response to the Office Action and a petition to revive the abandoned application. In that response, Leighton amended application claim 1, deleted application claim 11 and added new application claims 25-30. Leighton also submitted a

terminal disclaimer to overcome the obviousness type double patenting rejection over the '099 and the '207 patents.

As for the 35 U.S.C. §103(a) rejection, Leighton argued that the filing date of his application predated the reference and thus that reference is not valid prior art. Leighton amended the specification to include the benefit of the filing date of the '255 provisional, filed on August 21, 1996, and the '685 provisional, filed on October 17, 1995. Leighton also traversed the prior art rejection arguing that the UK '283 reference "does not disclose or suggest placing the assembly into the press and then heating the press and assembly under minimal pressure as does Applicant's invention." Office Action Response, Ex. 9, p.86. He further argued that "[t]he '283 reference specifically states that the laminate is cooled with the pressure *maintained* at its highest value." Office Action Response, Ex. 9, p.87. (Emphasis in the original).

The USPTO mailed a final Office Action on May 8, 2002. The Examiner persisted that the claims were still not patentable. In this Office Action, the Examiner rejected application claims 1-10, 12-17 and 23-29. The Examiner also withdrew application claims 18-22 and 30 from consideration since the claims were not elected by Leighton. And because the terminal disclaimer that Leighton submitted was defective, the Examiner maintained the obviousness double type patenting rejections.

The Examiner rejected new application claim 27 under 35 U.S.C. §103(a) as being unpatentable over the Japanese Patent in view of UK '610, optionally further taken with UK '283, for the same reasons given in the Office Action dated December 6, 2000 in rejecting the then pending claims. Also under 35 U.S.C. §103(a), the Examiner rejected application claims 1,

4-10, 14-17 and 25-29 as being unpatentable over the Japanese Patent in view of UK '610 and Templeton Jr. et al., optionally further taken with UK '283, also for the same reasons enunciated in the Office Action dated December 6, 2000. The Examiner rejected application claims 2, 3, 11-13, 23 and 24 under 35 U. S.C. §103(a) as being unpatentable over the same references provided in that previous Office Action further taken with UK '899 also for the same reasons expressed in that Office Action. The Examiner used identical passages from the Office Action of December 6, 2000 to finally reject all the claims. In response to Leighton's argument that UK '610 was not prior art, the Examiner countered that the publication date of that UK reference (November 1, 1995) predated the earliest effective filing date of the '367 application (August 21, 1996) and therefore that reference is prior art under 35 U.S.C. §102(a).

On October 2, 2002, Leighton mailed his response. He canceled application claims 6, 18-22 and 30, amended application claims 1, 15, 25, 27 and 29, and added new application claim 31. Among other changes, Leighton amended independent claims 1 and 27 to recite that "the second pressure being at least 10% greater than the first pressure". Leighton also alleged that neither of the UK patents teach increasing pressure during the cooling process. To overcome the rejection of application claims 1 and 27 over the cited references, Leighton again emphasized that the lamination of a card with an embedded chip is the problem being solved:

The problem being solved by Applicant is the problem of *forming a laminated card with embedded computer chips and electronics* that are thin enough to work in connection with existing card reading machinery (specification, page 3, lines 11-20). The problem being solved by UK '283 is preventing flexing of the card, which can cause cracking in the card layers, page 1, lines 15-17. UK '283 then addresses this problem by orienting the "grain" in different card layers at right angles to one another (page 3, lines 23, 31) and by embedding star shaped stress reduction members in the laminate (page 4, lines 28-31). Because UK '283 is solving a different problem, laminate cracking, than the problem being

solved by Applicant, overall thickness of the laminated card, one skilled in the art would not consider UK '283 to be relevant to the problem of overall card thickness. Therefore, even if UK '283 taught increasing the pressure during cooling, there would be no motivation to combine UK '283 with the other references to solve the problem of card thickness.

Office Action Response, Ex. 9, p. 177. (Emphasis added). Leighton also maintained that even if the three references were combined properly, the references would not suggest cooling the core while applying a pressure at least 10% greater than the pressure applied to the heated core.

Not having art specifically teaching a pressure increase of 10% during cooling, the Examiner allowed application claims 1-5, 7-10, 12-17, 23-29 and 31 in a Notice of Allowability dated October 9, 2002. That Notice of Allowability confirms the reason the Examiner allowed the claims:

None of the prior art of record taught or suggested that one skilled in the art at the time the invention was made to apply a second pressure upon the assembly during cooling wherein the second pressure was at least 10% greater than the first pressure applied during assembly and heating.

Notice of Allowability, Ex. 9, p.127.

**Appendix C -- List of Exhibits Attached
to Accompanying Declaration of James David Jacobs**

Exhibit 1	U.S. Patent No. 5,817,207
Exhibit 2	U.S. Patent No. 6,036,099
Exhibit 3	U.S. Patent No. 6,214,155
Exhibit 4	U. S. Patent No. 6,514,367
Exhibit 5	Provisional Patent Application No. 60-005,685
Exhibit 6	File History - U.S. Patent No. 5,817,207
Exhibit 7	File History - U.S. Patent No. 6,036,099
Exhibit 8	File History - U.S. Patent No. 6,214,155
Exhibit 9	File History - U.S. Patent No. 6,514,367
Exhibit 10	Document Comparison of Patent No. 5,817,207 and Patent No. 6,036,099
Exhibit 11	Document Comparison of Patent No. 5,817,207 and Patent No. 6,214,155
Exhibit 12	Document Comparison of Patent No. 6,036,099 and Patent No. 6,514,367
Exhibit 13	Document Comparison of Patent No. 5,817,207 and Patent No. 6,514,367
Exhibit 14	Definitive List Of Claims To Be Construed By The Court
Exhibit 15	U.S. Patent No. 4,450,024
Exhibit 16	Provisional Patent Application No. 60/024,255